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Railway Age

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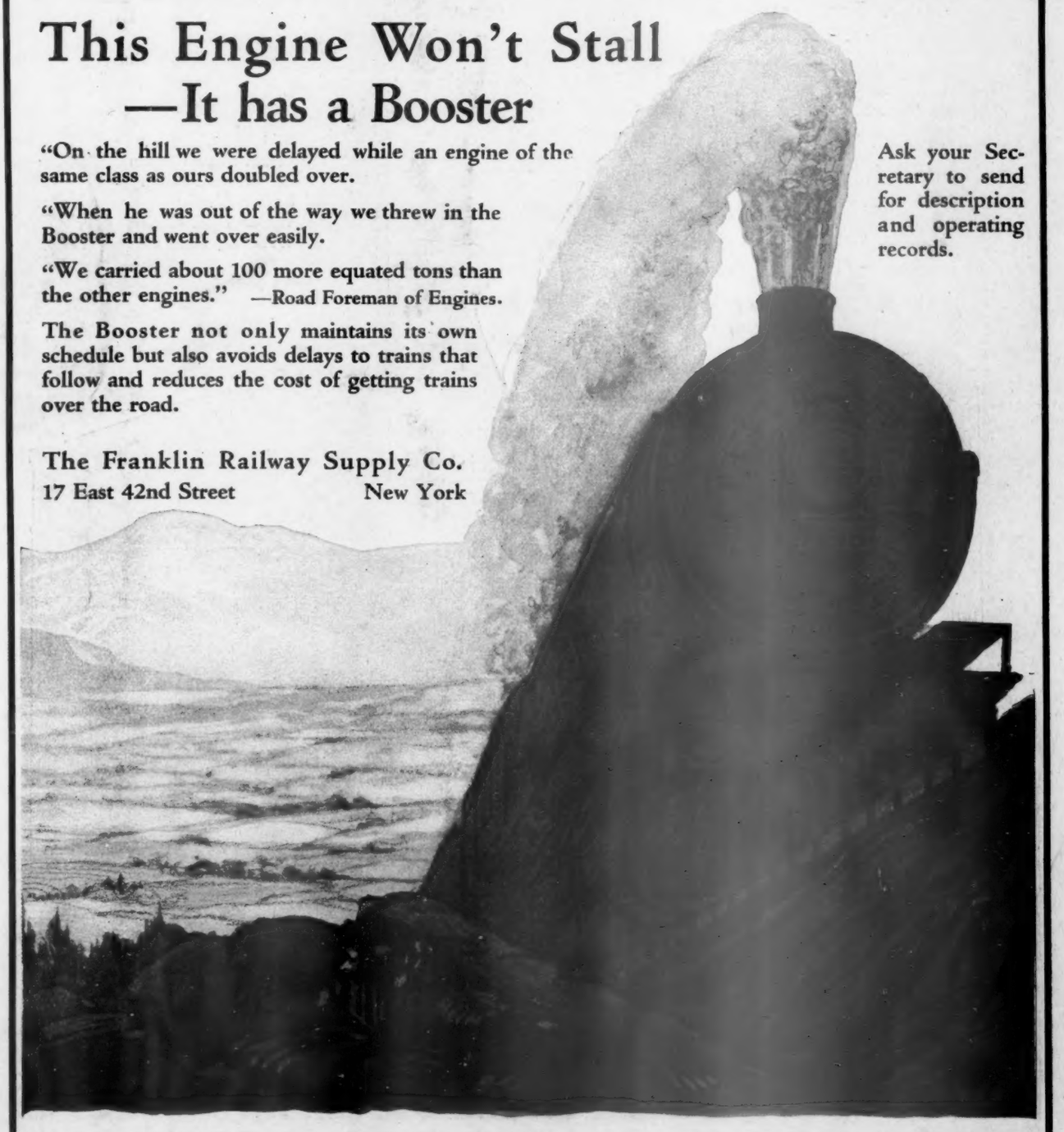

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EDITORIAL

Railway Age

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"Welcome the Coming, Speed the Parting Guest"

WELL, ANYWAY, a lot of railroads as well as a lot of people are still alive on the last day of the year 1921, which is the date of publication of this issue of the *Railway Age.*

Our Annual Review Number, giving in detail the railway history of this year, will be published next week. It will be a statement of facts, which, if carefully read, will convince any reader that the railways are justified in being glad to see the tail light of the year 1921 disappearing in the darkness.

It's been a hard old year—a year of turmoil, controversies, struggles, deficits, unemployment, apprehension and gloom. It runs true to form right to the close of its race. It ends with a slump in traffic and earnings. Nobody can be very sorry to see it go.

We have been told through all the ages, though, in both prose and poetry, that adversity is a very good teacher—in fact, one of the best. "Prosperity," said Lord Bacon, "is not without many fears and distastes; and adversity is not without comforts and hopes." He was a wise man, who had known both great prosperity and adversity. The railways have got about as well acquainted with adversity in 1921 as they, or any other industry, ever did.

But, like Lord Bacon's, their adversity has not been without its comforts and hopes. Real progress has been made toward restoring efficiency and economy in operation. The public mind seems to be more understanding and friendly right at the end of the year than it was some weeks ago.

Many men have had physical and mental breakdowns. Some of them fully recovered from the effects and greatly profited by the lesson. We know some men who went bankrupt two or three times, and thereby learned lessons from which they subsequently coined millions.

The true test of the will and ability of every man, of the management of every industry, of every nation, comes not when everything goes well, but when "everything goes dead wrong." Most things have gone dead wrong in the railroad business in 1921. The experience was replete with lessons, as such experience always is. We don't pretend to know just what all the lessons were, but experience is the best teacher, and in a year when experience is so unprecedentedly busy in teaching, a lot of lessons must have been taught.

How many of them were both taught and learned, we shall be able to judge better perhaps several years hence. One thing is certain. Never did the railways at the end of any year "welcome the coming, speed the parting guest" with more sincerity and fervor.

Important to Subscribers

The *Railway Age* will print at the end of the present volume only a sufficient number of indexes to meet direct requests from its subscribers. Those desiring indexes should, therefore, advise the New York office, 2201 Woolworth Building, New York.

"If Wishes Were Horses"

"Poor Richard's Almanac" is out of print and "Poor Richard" himself is dead. But his "If wishes were horses all beggars might ride," like the soul of John Brown's body continues "marching on." There has been a week or more of wishing,—by each and everybody for somebody else; a new year being almost here. Men everywhere, catching the spirit of the season, have postponed routine for the moment to extend goodwill and to receive it, and having done so, feel the better for it. Like rest and food after a laborious march it has revived us. But there it stops. Concerning the future there is work to be done which wishes will not perform, marches to be made which greetings will not accomplish, problems to be overcome which goodwill will not solve. To know this is not to enjoy the spirit of the occasion any the less, but to realize our position concerning the new year all the more. In reviving us the season has done its part and it now remains for us to do ours. Remembering this, and that a new year is again upon us, and that time waits for no man, why should not all of us, revived in spirit "fall in," "right dress," "call off" and "forward" to the march!

Public Invited to Inspect Engine Terminal

It is a disputed question and one now pending before the courts as to whether the United States Railroad Labor Board has or has not the power to enforce its decisions. However that case may be decided, the real power which lies behind the successful enforcement of any law is public opinion and this fact is coming to be more fully realized not only by politicians and industrial leaders but railroad men as well. The real reason, for example, for the recent decision of the railroad brotherhoods not to strike undoubtedly was their feeling that a very large proportion of the American public would strongly oppose any such action. The railroad managements also realize the importance of favorable public opinion. It is probable that a desire to show the difficulties of engine terminal operation and the facilities for meeting those difficulties caused the Lehigh Valley recently to arrange for a public inspection of its terminal at Ashmore, Pa. This

terminal is a comparatively new development, having been taken over for operation by the railroad in July, 1920. Recently the Lehigh Valley invited the Chamber of Commerce and Rotary Club of Hazleton, Pa., to visit the Ashmore terminal, transportation to and from Hazleton being provided, and every effort was made for the comfort of guests and for the ready inspection of the plant. The idea was to enable business men of Hazleton to become better acquainted with the railroad officers and understand something of the work involved in maintaining locomotive running repairs, cleaning fires, handling ashes and supplying coal, water and sand. The Lehigh Valley has taken a step in the right direction in this case and one which can profitably be followed by other roads.

Free Service to Exporters

Commerce Reports, the official publication of the Bureau of Foreign and Domestic Commerce, has in a recent issue an interesting compilation of the various trade associations and individual companies which are co-operating with its newly-created commodity divisions in the effort to make more effective the Bureau's work in fostering America's foreign trade. No less than eight associations of manufacturers of textiles are working with the Bureau's Textile Division. Manufacturers of many other commodities also are included in the list as being in close touch with the various divisions which have to do with collecting information regarding the foreign sales of their products. In the whole list, however, there is no mention whatever of any individual manufacturer or association of manufacturers who are working with the Bureau's Industrial Machinery Division. This is the division which is working in the interest of our foreign trade in railway equipment and supplies. Unless there has been some omission from the published list, then, it would seem that manufacturers of industrial machinery have been somewhat slower in realizing the value of the free service offered them by the Bureau than have the producers of other commodities. All the Bureau seeks from the manufacturer is the opportunity to serve and it should be accorded this opportunity wherever possible.

Abusing the Steam Locomotive

One of the most important advantages of the steam locomotive is its reliability. It is inherently a very flexible machine; the load can be varied over a wide range and the power output adjusted to take care of it. The steam locomotive can stand a tremendous amount of abuse. It may have numerous mechanical defects and yet will pull its load where a less sturdy machine would fail. Railroad men are so familiar with this fact that they are apt to regard the ability of the locomotive to produce results under unfavorable conditions as a matter of course and to take advantage of it by operating power that is not in the best condition. This may be permissible in an emergency, but the practice of persistently running locomotives with minor defects to keep down maintenance charges cannot be too strongly condemned. No machine can be expected to operate economically unless it is maintained in first-class condition and laxity of inspection or maintenance practices which permits defective locomotives to continue to operate without repairs is false economy. Yet this condition probably exists to a considerable extent. In some cases maintenance standards are very high, but inspection inadequate. For example, a locomotive was taken from regular service to be tested and a thorough examination showed the superheater joints had been leaking badly for some time. On another road, indicator tests showed locomotives were performing without complaints from the crews that had valves improperly set; after the defect was corrected they burned 25 per cent less fuel. When such conditions exist would it not be advisable to develop methods for preventing these losses by the use of superheat pyrometers and steam engine indicators and by thorough, consistent inspection?

Reorganizing the Railways of France

The railways of France are to be brought into much closer union under a recent enactment of both houses of the French Parliament. During the war and since, the private companies have sustained heavy deficits which have been met in large part by the government. Under the new legislation the railways will be permitted to pay only their pre-war guaranteed dividends and all additional earnings will go into a common fund to be used in meeting the expenses of the railways showing deficits. Rates under the new plan are to be fixed at a level sufficiently high to meet expenses, including dividends. These rates, however, are subject to approval by Parliament which must take into consideration the general economic situation. Consequently if rates high enough to meet expenses are not allowed the government will have to make good the deficit. Such advances from the government are, however, to be repaid from the common fund upon the return of normal business conditions. In any event a surplus in the common fund will revert to the government. The existing railway companies are to remain intact, but their actions are to be largely circumscribed by two administrative bodies, the Higher Railway Council and the Executive Committee. The Council is to be made up of some sixty members, representing management, employees and public. Its function is mainly to act as an advisor to the Minister of Public Works. The Executive Committee is made up entirely of representatives of the managements and its duty is to put into effect the decisions of the minister and the Council on all the railways. Relations with labor are to be taken care of by an arbitration tribunal, half of the membership of which is to be composed of representatives of the railways and half of representatives of the employees, all of whom must be members of the Council. This tribunal will be presided over by a member nominated by the public group on the Council. Some incentive to efficient operation is provided for by a provision allowing a management premium and an employees' premium on any road showing substantial increases in operating efficiency. This is practically the only feature of the legislation which makes the new plan essentially different from out-and-out government operation. The railways, however, were apparently not opposed to the plan.

Are Upper Berths Too High?

A gentleman has written to the New York Tribune suggesting that the price of upper berths is too high and that it should be not 20 per cent below the price of lower berths but 50 per cent less. His argument is based on the fact that few persons like to take an upper berth with the result that sleeping cars run too frequently with many of the upper berths unoccupied. He might have added that if the car is fully occupied the majority of the passengers in the upper berths are disgruntled and dissatisfied at the service they get. This is an old problem which thus far has found no solution. An attempt was made to solve it some time ago by the use of the aisle light. The latter did make the uppers less undesirable but came far from making them entirely desirable, as the actual results have shown. It is rudimentary economics that if a concern is manufacturing, let us say, two commodities—one its main product and the other a by-product—

the respective prices should be such that both can be sold. This is not the practice with sleeping car berths. The lower berths are in most demand, but only in exceptional cases are a good share of the uppers sold. If our New York Tribune friend is right, the price of the uppers must be wrong. In other words, the contention is that it is the price of the upper berth and not the berth that is too high. This is not a simple matter to decide. We have attempted above to suggest a solution on the basis of the law of supply and demand. The trouble even with that is that some people have proposed an agitation to repeal that law and we understand from some of the more brilliant embryo writers on economic subjects that the law, like the eighteenth amendment, has fallen into disrepute. However, the fact remains that even with all that has been done and said, upper berths are not particularly desired by railroad travelers.

When Winter Comes

When winter comes the railroads are by no means the last to know it. Lubrication everywhere becomes less effective. Wheels slip. Track equipment, becoming clogged with snow, requires immediate and constant attention, and ice forming on surface water makes it less suitable for boiler use. Outside work becomes exceedingly disagreeable and snow drifts in the path of traffic add the more to the multitude of forces and effects which conspire to delay traffic, antagonize a fastidious public and increase the already heavy expense of transportation. Thus, it has always been and to some extent always will be. For winter will not cease to come. And yet, do railroads, encountering winter, apply themselves creditably in all respects to become less affected by it? A drain which must be kept open freezes and like water tanks or locomotive tenders which are permitted to overflow in their filling, occasions large expenditures for removing ice which never should have formed. A shipment of coal, gravel, earth or cinders, loaded into cars wet and delayed in disposition, or left unprotected from the thawing and subsequent freezing of a snow to which it was exposed, necessitates expenditures in its removal toward which dumping facilities of cars offer little assistance. A pumping station or water treating plant succumbing to the cold becomes temporarily inoperative at a time when perhaps it is needed most, and expenses are thereupon involved in effecting its repair; or open cracks in these or other buildings make themselves apparent at an inopportune time and make additional demands on overtime and coal. A passenger train, its passengers already nettled by irregular temperatures attributable to the susceptibility of unprotected heating pipes to cold, or aggravated by previous delays however unavoidable, is again delayed until a hose line is sufficiently thawed out to permit of supplying the necessary water to the several cars. It is in incidents like these that the question advanced has a natural origin for when such incidents occur they are suggestive more of neglect than of "providential visitation." The fact that incidents of this kind do occur and arise from forces which often permit of complete control, constitutes an aspect of railroading which not only merits but challenges attention.

Spending Money Wisely

When the Delaware, Lackawanna & Western spent over $14,000,000 on the revision of 40 miles of its line west of Scranton, Pa., a few years ago, it was said by some that only a wealthy road could afford to undertake improvements of this character. However, in 1920 the operating economies effected by this improvement yielded a return of over 12 per cent on this expenditure of more than $300,000 per mile, whereas the money itself was secured at a rate of less than 4 per cent. This is another example of the returns which are awaiting the expenditure of large sums for the improvement of railway properties in all parts of the country. The old saying that nothing succeeds like success applies with special directness to the railways. It is frequently the case that the roads which are confronted with the highest operating costs and are in the greatest need of those improvements which will enable them to reduce these costs, do not have the credit which will enable them to make these expenditures. The result is that their costs continue to rise and their credit to fall. On the other hand, the road which can raise sufficient money to finance a major improvement can use the returns from this improvement to finance still other work. A glance at the operating returns of the railways of this country will show that those roads which have added most liberally to their facilities in recent years are today making the best showings. E. H. Harriman's well-known foresight in this direction brought the Union Pacific from bankruptcy to its present high position. E. P. Ripley accomplished the same transformation with the Santa Fe by pouring large quantities of money into the property. The Burlington, and, in recent years the Illinois Central, are examples of the results which come from the continued improvement of a property to enable it to keep pace with or in advance of the demands of traffic and to handle this traffic with the maximum economy. The growth of our country has been and still is such that the demands for transportation are increasing constantly. Therefore, instead of waiting until the present facilities are outgrown to rebuild or enlarge under the burden of an overload, it is more economical to prepare reasonably in advance and then to reap the reward of economical operation as business increases. It is the history of transportation in this country that traffic comes to the road which is prepared to handle it. It is the management which is just a little more courageous than the rest that sees this opportunity and does its best to grasp it.

Abolition of Transportation Taxes

THE ABOLITION of federal taxes on transportation on January 1 will result in reducing the amount of money the public pays to the railways between $200,000,000 and $300,000,000 annually, the amount of the reduction depending on the amount of traffic handled. While the railways have collected this tax they have not, of course, received any of the money derived from it, having turned it all over to the federal government. The tax on freight revenues is 3 per cent, and on passenger revenues 8 per cent. The freight tax of the Class 1 railways in 1921 has amounted to about $108,500,000, and the passenger tax to about $92,500,000, a total of about $201,000,000. The total in 1920, when a much larger traffic was handled, was about $233,000,000. While these taxes have gone to the government, and not to the railways, their abolition will of course have exactly the same effect as would the reduction of freight and passenger rates by corresponding amounts.

In addition to having collected these transportation taxes for the federal government, the Class 1 railways this year have paid taxes levied upon them by the federal, state and other governments of about $290,000,000. The amount paid in dividends to all their stockholders in 1920 was only $271,500,000, and will be substantially less this year. In other words, the governments are now taking more of the earnings of the railways in taxes each year than the stockholders are receiving in dividends.

The transportation taxes collected by the Class 1 railways for the federal government, and the taxes paid by them to federal, state and other governments, will together amount this year to over $490,000,000. The total net operating in-

come earned by them in the first 10 months of the year was less than $497,000,000, which shows that, directly and indirectly, the taxes levied by the government upon transportation during the year will fall not far behind the total net return earned by the railways with which to pay the interest on all their bonds and other evidences of indebtedness, as well as dividends on all their stock.

From 1912 to 1921 the taxes paid by the railways from their earnings have increased from $109,500,000 to about $290,000,000, or 164 per cent. On the other hand, between 1912 and 1920 the total dividends declared declined from $340,000,000 to $271,500,000, and, as already indicated, those paid in 1921 have been still smaller, although the exact amount is not known. While, as a result of government regulation and control, the railways have been a source of declining income to their owners, they have been a source of very rapidly increasing income to the governments that regulate them.

Including both the taxes levied on the railways themselves and taken from their earnings, and those levied by the government on the traffic handled by them, the total taxes derived by the various governments from railway transportation increased by $380,500,000, or 348 per cent, between 1912 and 1921. Meantime, freight rates have been increased only about 75 per cent, and passenger rates less than 60 per cent. Plainly, it was the government's turn to move toward reducing the "burden of transportation costs."

The American Roads Are More Progressive

THE DEVELOPMENT of reinforced concrete construction practice in North America is admittedly an outgrowth of prior scientific studies on the continent of Europe, notably in France. Therefore, it is a matter of no little satisfaction to American structural engineers, particularly those engaged in railroad work, to know that the use of reinforced concrete by the railroads of this country and Canada has been carried far beyond anything accomplished in Europe.

Bulletins of the International Railway Association issued during the past year present some interesting data on this subject. The report by the late C. A. Cartlidge, formerly bridge engineer of the Chicago, Burlington & Quincy, prepared in 1914 and a 1920 supplement by his successor, G. A. Haggander, summarize American practice, the latter showing that 26 out of 29 railroads report making use of reinforced concrete slab spans to carry railroad traffic. This is in sharp contrast to European custom. While concrete has been applied extensively abroad for the construction of piers, overhead bridges, buildings, fences, platforms, etc., its use in beams, slabs and arches, to carry railway traffic, has been extremely limited.

Thus the report by Marcel Castieu on Belgian, French, Italian, Spanish and Russian railways, states that "It is practically only in Italy that subways having spans of more than 15 ft. 5 in. or 19 ft. 8 in. have been built wholly (floors and girders) of reinforced concrete." Similar comments are made by the reporters for the English and Dutch railways.

It is true that European practice, as reported, represents the status as of 1914 because of the virtual suspension of permanent construction during the war period. It is also a fact, as reported in articles by Major O. F. Allen appearing in the *Railway Age* during the past year, that more extended use is being made of concrete in the restoring of the French railroads in the devastated areas. But even there the concrete work is largely in the nature of arch spans rather than of the slab construction which has had such extended development in America.

Such wide disparity between American and European practice must have a logical explanation. One reason is apparent in the text of the International Railway Association bulletins, namely, a lack of confidence abroad in concrete for carrying the heavy and rapidly moving loads of railway trains. Another objection to concrete is based on aesthetics —a feeling that better appearance may be obtained with cut stone masonry and brickwork. Another is perhaps the greater adaptability of the American workman to employment in a new craft. Whatever the prejudices and objections in Europe, it is clear to all who are thoroughly conversant with American experience that they do not apply on this continent. There have been failures here in great numbers, but they can all be explained by improper design, workmanship or material, and there is now no hesitancy on the part of American railroads to spend great sums for bridges built of concrete.

Why Repair Foreign Cars?

THAT THE HABITUAL neglect of the foreign freight car is a source of dissatisfaction to officers of the transportation department as well as those of the car department was clearly brought out by N. D. Ballantine, superintendent of transportation of the Union Pacific, in his paper before the last meeting of the Western Railway Club. Mr. Ballantine, whose paper will be found elsewhere in this issue, has performed an invaluable service in drawing attention to and analyzing the effect of a number of transportation factors influencing the decision as to the advisability of making foreign car repairs which have not generally been considered in discussions of this subject. Two of these factors—the per diem rate and the cost of switching to and from the repair tracks—have a direct influence on car repair costs. Mr. Ballantine's conclusion with respect to these two items is that they constitute fixed charges—in the one case against the amount of direct expenditure per day and in the other against the total amount of direct expenditure for shopping and hence, whenever a car is placed on the repair track it is desirable that the maximum practicable amount of work be done and done expeditiously, in order that the amount of these two fixed charges to be carried by each dollar of direct expenditure may be reduced to a minimum.

Here, then, is a conclusion which would seem to justify a material increase in the extent of the repairs made to foreign cars. Unfortunately, however, one other condition must be taken into consideration before this conclusion can be fully accepted. That condition is the adequacy of the surcharge included in the billing price for labor as well as the adequacy of the billing prices of materials to completely cover both their direct and indirect cost. The present labor allowance of $1.20 an hour was established to include a surcharge of about 15 per cent for direct supervision, 35 per cent for shop expense, switching and superintendence and 6 per cent for fixed charges, a total of about 55 per cent on the basis of 77 cents an hour direct labor charge. At the present time, with a labor rate of 72 cents an hour, the total surcharge has been increased to 66.6 per cent, but with shop overhead in many cases conceded to be over 70 per cent and probably, if all legitimate items of overhead were known, coming nearer to 100 per cent. An increase in the extent of foreign car repairs necessarily involves an increase in the loss to the repairing line, although the rate at which that loss increases may be less than the rate of increase in the direct labor charges. Furthermore, any extensive increase in the amount of repairs made to the foreign car must tend to increase the proportion of fixed charges which must be covered by the total surcharge, because of the fact that more shop work will be required, thus taking up the time of shop

facilities when otherwise only the repair track facilities would be involved.

It would seem, therefore, that the costs of labor and materials are still the key to the situation and that until a road is satisfied that the prices for materials involve no direct loss on that item and that the labor surcharge includes a margin above its average overhead cost which may be applied to absorb some part of the transportation switching costs and the per diem accruing while the car is out of service, there is little incentive for that road to make more than the necessary minimum repairs to foreign cars.

Unified Railroad Electrical Engineering

MANY OF THE smaller railroads can effect economies by the proper unified supervision of the installation and operation of electrical devices. The telegraph was the first application of electricity on the railroads. As electrically-operated highway crossing alarms were introduced the telegraph department naturally took charge of these devices on many roads. However, as the installation of interlockers and automatic signals became extensive, the larger roads established separate signal departments to handle these facilities and also the highway crossing bells. Another department grew up soon after to take charge of the electric lighting of buildings, and the installation of motors in shops, pumping plants, etc.

These three applications of electricity are distinctly separate and the larger railroads can well afford to employ experts for each of them. However, the smaller roads require only a comparatively small part of a highly specialized man's time for each of these separate lines. The problem was solved by one such road by the consolidation of all work of this character in one office. Such a position might carry the title of "superintendent of communication and signals" or "signal and electrical engineer." If the majority of the telegraph plant is operated by the Western Union under contract, his problem in railroad communication is mainly to provide adequate telephone train dispatching and conversational circuits. The maintenance of such equipment has, in several important cases, already been combined economically with the maintenance of automatic signal apparatus. The installation of the wiring and fixtures for the electrical illumination of buildings is to a great extent fixed by standard rules of the insurance underwriters and, whether installed by contractors or railroad forces, is largely an inspection problem. The selection of the motors for shop machinery, pumping plants or coal chutes is limited in most cases to a few types recommended by the manufacturers of the machinery.

One may question how one man can become efficient in all of these several departments. The first requisite is that he confine his energies principally to the engineering of these installations. By participating in the activities of the different sections of the American Railroad Association, the Association of Railroad Electrical Engineers and kindred organizations, and by studying various installations on other railroads, it has been demonstrated that one man *can* master these kindred subjects.

With the installation of any equipment properly engineered, the maintenance resolves itself into a routine, the efficiency of which can be checked readily by men trained in the department. As stated above, a few roads have already seen this opportunity. It would seem advisable for other roads which require only a limited amount of such equipment to investigate their future needs with the idea of educating one man to handle these allied electrical problems.

Letters to the Editor

[*The* RAILWAY AGE *welcomes letters from its readers and especially those containing constructive suggestions for improvements in the railway field. Short letters—about* 250 *words—are particularly appreciated.*]

An Undergraduate Defends College Training

CAMBRIDGE, MASS.

TO THE EDITOR:

As an undergraduate I cannot allow to go unanswered the letter by "One Who Has Seen," published in the *Railway Age* of December 12. If one were to accept this writer's judgment as final, it would be to conclude that a college education, for its benefits in post-graduation days, is worthless; that "call boys" make better railroaders than college men; that a modern technical education is merely the learning of a trade, and that college graduates are only a conceited bunch of good-for-nothings.

It would be pitiful if it were true, but it is not. As I pointed out in a previous letter (*Railway Age*, September 17) college graduates are in increasing demand in every important industry—except the railroads. Such being the case, it proves that either these industries are all wrong in their misplaced confidence in the college trained man, or else they are asleep.

It might be conceded that the "call boy" makes a better railroader under the present system of the subordination of the individualism of a man, but to claim that this is due to the wider experience of a "Call Boy" seems unreasonable. It means there is something wrong with the individual, if a man can go through any large educational institution and not have a more diversified knowledge and a more open mind than the man who has grown up in the atmosphere of specialization, which railroading professedly demands. It is the men with this ability to view the situation from more than one angle that the railroads now feel the lack of, and it is this ability the college man should be able to bring them.

A modern college education is not learning a trade. The individual may make it such if he wishes, if he confines himself solely to his books. But if he enters into the life of the institution, puts in something besides his tuition fee by virtue of his entry into college activities, and takes away something besides his degree in the form of friendships with his classmates and a knowledge of human nature, he has learned something far more than a trade. And as for any undergraduate course of study limiting the individual's field after graduation, this is ridiculous in face of the facts. Graduate records of the Massachusetts Institute of Technology show less than 60 per cent of its graduates follow the kind of work they specialized in as undergraduates.

Is the college man really a conceited prig? It is a fallacy of the newspaper public to judge the rank and file of college men by the *faux pas* of a few. The average college man who is in search of a job upon graduation has invested from $3,000 to $5,000 in an education, and he feels justified in his investment. He is as much entitled to pride in his investment as the man who has bought a $5,000 automobile, rather more so, as the college education gives the man the advantage over his fellows in increasing the wealth of the community, an advantage the automobile cannot give. But the education cannot benefit the community to its full advantage if spotted behind a clerk's desk any more than one can the automobile if left out-of-doors in a blizzard.

To be sure, the college man must learn the game from the

ground up, but why make him wait till the end of his career to do it? Let the railroads encourage men to spend their summer vacations learning the rudiments. In this way, both parties can choose their paths without undue expense on either hand. The old-time fascination still exists, and I believe it is increasing among college men. Let the railroads show their share of interest, and we shall see if "One Who Has Seen" has seen it all.

LEANDER H. POOR.
"Boston Tech" '23.

Some of Mr. Ford's Ideas May Be Sound

NORTHWEST REGION.

TO THE EDITOR:

The articles in recent issues of the *Railway Age* concerning Mr. Ford's railroad are of interest to all railroad men. There are many claims of important changes that have been brought about on the T. D. & I., among which are the eight-hour day for everybody, no Sunday work, the speeding up of the movement of both loaded and empty cars, and getting a full day's work for a day's pay, etc.

I know there are many old-time railroad men who will not agree with me that it is practical to operate a railroad on an eight-hour basis and without Sunday work, but I claim that such a thing is possible and that the railroads of this country would save millions each year if they would come to an eight-hour day, six days a week, from the president to the section laborer. During federal control many lines tried in a half-hearted manner to cut out Sunday work. At that time I was a general yardmaster on one of the lines in the Western region, which practically tied up from seven o'clock Sunday morning until midnight. The result was that by Monday night we were just about as far ahead as if we had worked every engine in the terminal on Sunday and had run a race with ourselves to see how many drags we could operate. Have you ever noticed how light business is on Monday, regardless of how many engines you may have taken off Sunday? During the past summer the line that I am now with ran only live stock and perishable trains on Sunday. The result was that in this terminal, instead of working 42 switch engines, only 12 were operated, thus saving 30 switch engine days, and Monday night found us in excellent shape as far as the general condition of the terminals was concerned.

The prompt movement of freight and the speeding up of the car movement is another thing that every railroad should give more consideration to. The amount of time it takes to get cars through district terminals on several lines upon which I have worked is excessive, especially in times of car shortage. The terminal superintendent or trainmaster who demands of his organization that every car which has completed loading on industries in his own yard must move in the night, and who demands that his yard shall at all times be properly classified, with the rough box, grain box, auto cars, coal cars, stock cars and other classes of cars kept separated and always ready for movement, has the key to successful and speedy car movement. The general superintendent or general manager who does not demand these things is weak when he lets his terminal organization tell him that such operation is impossible.

Another point brought out in article is that Mr. Ford is demanding a full day's work for a day's pay. Is there any reason why every railroad should not demand as much or why they should not get it? The only reason that I can see for not getting a full day's work from every man is that we are not insisting upon it. The minute a yardmaster or trainmaster commences to get after his men, to get more out of them, he, of course, gets in wrong with the drones, and the result is that it isn't long until the general chairman is told all about how so-and-so is trying to make a record for himself and is spoiling all the good jobs. The general chairman talks to the general superintendent or general manager and the result is that you are put down as a disturber, called antagonistic and told that you do not have the good-will of your men. The first thing you know the general superintendent, who has lost his nerve, tells you not to crowd things too far and the result is that the yardmaster, trainmaster or superintendent lets things drift. As a matter of fact, if the general officers had the nerve they need to let you alone for a short time until some of the drones or loafers have either been started to work or cleaned out, they would find that things would quiet down, the men would get into the game and give good service, and instead of knockers, everyone would be proud of the record made on the division.

When the order comes to reduce expenses, you can't speed up the work to do it, but must pull off a few section men and let your track go to the bad, or lay off a few clerks and let the check of the yard and your demurrage records get behind, or pull off an engine or a yardmaster and let the service suffer. If we had 100 per cent efficient operation and were getting a full day's work from every employee instead of having to reduce expenses spasmodically as is done at present, we would find that our expenses would be reduced automatically with the falling off of business. These are the conditions I have found on some of the railroads on which I have been employed.

ASSISTANT SUPERINTENDENT.

Keep Trains Moving

CHICAGO.

TO THE EDITOR:

Considerable thought is being given today to the better movement of trains. The modern advertising of signal apparatus is, "Signals Keep Trains Moving." "Why stop a moving train to tell it to proceed?" One writer has humorously and aptly given the definition of a siding as, "The kitty in which most of the dividends are dropped." It is obvious that the economical operation of railroads prohibits the unnecessary stopping and standing of trains, and the thinking signal engineer is bending his efforts toward keeping trains moving.

Some splendid results have been accomplished in the elimination of standing trains by signaling tracks in both directions and changing the current of traffic during certain hours. Unnecessary stops are being considered and the chief offender (the stop-and-proceed automatic signal indication) is being weighed in the balance. Can this stop at an automatic signal be eliminated? Lack of confidence in the engineman's proper observance of signals seems to be the only question of doubt.

Observation of the actual speed at which many enginemen run their trains, after passing signals in the caution position, does not make one particularly optimistic about what would happen if they were allowed to pass the next signal without a stop when it indicates "block occupied"; and in most cases the engineman is observing signals as he understands them. He is approaching the next signal prepared to stop, expecting all the time to find a stop unnecessary, and applies the brakes only when he must do so to avoid overrunning a stop signal.

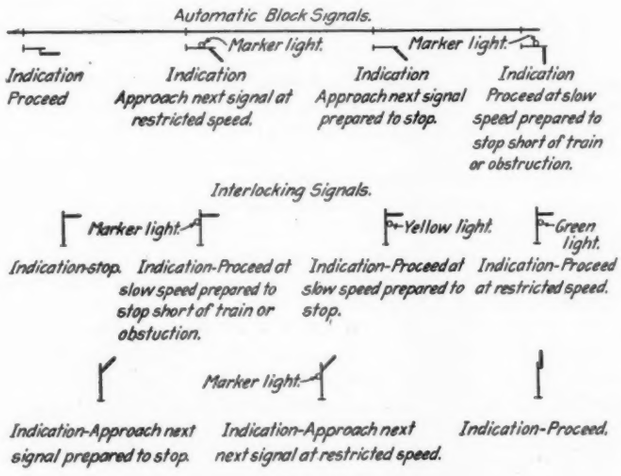
It is true that many enginemen do reduce speed immediately after passing a caution signal, and some of them are very skillful about giving the block ahead time to clear, thus avoiding a stop; but we have with us always the engineman, whose chief thought is to make a good run and who is willing to take the chance to continue at a high rate of speed, feeling that he can make a stop if forced to do so. He is often pulling a high class train which he knows the dis-

patcher is anxious to get over the road, and his main thought is speed.

It was to take care of this fellow that a stop was insisted on before allowing a train to proceed into an occupied block, and if we remove the stop we must be sure that we have some other check on our man. We have been trying to educate him and have been more or less successful, but the fact that the majority of us are still insisting on the stop is proof that we are not sure of him yet.

Now suppose that we make the meaning of our caution signal more specific and *insist on a definite speed restriction* which cannot be exceeded after passing a signal in the caution position. It may be necessary to consider a three-block indication system to be sure of our man and to be able to check him up properly. This system has proved successful on busy lines and in congested terminal territory, and has made it possible to use short blocks safely. It has a great advantage in providing a distant indication for every caution signal and definitely indicating the speed at which a caution signal must be passed.

The modern light signal may make it possible to obtain



Proposed Signaling Scheme

simpler aspects for this system as we are able to make the semaphore arm equivalent vanish at will. We could accomplish the purpose with a marker light if a unit of a light signal were used, displaying the marker light only when better speeds were permitted. For instance, a signal displaying a yellow light or in the 45-deg. position in combination with a marker light, could be used as a distant for a caution signal and would indicate to the engineman—pass the next signal at restricted speed. The caution signal would then display a yellow light or the 45-deg. position without a marker light, and would indicate to the engineman proceed at restricted speed prepared to stop at next signal. The next signal, if displaying a red light or a horizontal position without a marker light, would indicate stop, but if a marker light were displayed, would indicate proceed at slow speed prepared to stop short of a train or obstruction. The clear position would display a green light or a vertical position only. The interlocking signal would then normally display but one light or one horizontal position; if clear, one green light or one vertical position; if at approach restricting, a yellow light or a 45-deg. position in combination with a marker light; if a caution, a yellow light or a 45-deg. position only; if at restricted speed, a green light under a red or a vertical position under a horizontal one; if at slow speed, a yellow light under a red or a 45-deg. position under a horizontal one; if set for a call-on move, a red light or a horizontal position in combination with a marker light. These are just a few of the possibilities and could, no doubt, be improved upon, but they give a mark to shoot at.

We are headed more and more toward speed control, so why not begin to make all our signals talk speeds to the engineman. *A great many accidents would have been prevented* if the meaning of a caution signal had carried with it a definite speed restriction. Let's make our signal systems such that, if obeyed, all enginemen will keep their trains running smoothly and efficiently, reducing speed by shutting off steam rather than by applying brakes, and stopping only when the route is not set or when they reach a train or obstruction. Let's keep our trains moving. T. H.

Extend the Budget System

CHICAGO.

TO THE EDITOR:

The use of the budget system is becoming more widespread among executives who control and direct the systematic conduct of business affairs; even the United States government has become interested in the subject. It is not new to the carriers who estimate their future expenditures for varying periods, and towards the end of the year prepare estimates for the costs of additions and betterments for road and equipment proposed by the various departments as part of the program for the ensuing year, and authorize such work as may be deemed necessary or expedient.

It would be well to go a step further at this time when the ablest minds are striving to solve the question of the best way to further the return to normalcy. I would suggest that budgets be prepared covering materials and supplies that may be needed for maintenance and repairs during the year 1922, or at least for the first six-months' period, said schedules to show estimated quantities or tonnage of such articles or materials that may be used regularly, provided they are standard or the quality or grade is satisfactory; and it would be advantageous to purchase under contract instead of in the open market when needed or sufficiently in advance to permit of manufacture and delivery; and that formal contracts be made or letter agreements be drawn up to cover the purchase of the items in question.

By thus making commitments covering either a definite quantity or tonnage—or naming an estimated figure or the range between a maximum and minimum of requirements—the manufacturer could go ahead and arrange for the purchase and assembly of necessary raw materials and manufacture to meet required deliveries. This will set the wheels of commerce in motion, and with many orders placed the effect would be far-reaching and the railroads would be benefited thereby; unemployment would be lessened, and market conditions would be stabilized.

I am not unmindful of the conditions under which the railroads are working, and that as traffic falls off expenditures are gaged accordingly; also that certain maintenance as well as new work is seasonal, and that the various roads have and follow certain well-defined policies with respect to making contracts for materials and supplies. But in view of the unusual conditions prevailing at this time, I believe that it is an opportune moment to invite consideration of the extension of the contract program.

The question may be raised as to the wisdom of making extensive purchases at this time when the market is unsettled and, generally speaking, on a higher level than it should be normally, but I believe that it will be conceded that prices have gradually receded from wartime levels and will not likely be any higher. Such commitments as are made could provide for price protection to the buyer in the event of decline in cost on unshipped material due on contract.

Under present conditions the price named in a contract

should be considered as a maximum figure in view of the business given the seller at this time instead of deferring the placing of the order until prices may be lower; and in justice to the buyer who may not need the articles or materials at this time, price protection should be afforded him as above suggested.

There is another advantage worthy of consideration with respect to making contracts in advance of immediate requirements, and that is the fellow who takes time by the forelock will be assured of delivery of a definite supply when he needs it.

These are personal views only, and I hope at least a discussion of the suggestions will follow.

I. N. T. ROBERTS,
Special Assistant, Purchasing Department, Illinois Central.

A Mature Student on College Men and the Railroads

COLLEGE STATION, Texas.

TO THE EDITOR:

I have followed with much interest the discussions in your columns of the college man and his chances on the railroads. I agree with both sides in this discussion. I agree with "One Who Has Seen" in the December 10 issue, when he says, in substance, that the college man, as a rule, is egotistic.

I happen to be a student of civil engineering in the Texas Agricultural and Mechanical College, and, being a close student of human nature, I can see a large amount of ego in my classmates. I say this in all candor and back it up with the statement that there cannot be a finer bunch of young men in any colloge. It is just a superior air that one will adopt, if one is not careful, when one attends college. I am twenty-eight years old, and having worked in the engineering profession before coming to college, I have seen this trait in many young engineers. This same superior feeling prevents the college man from rubbing elbows with what he terms "rough necks." This has the disadvantage of preventing him from learning little tricks here and there, because the working man has no patience with a "dude" and will therefore refuse to help him. It is this same know-it-all spirit that keeps the college man from taking advice from the experienced non-college man.

There is another phase of why the college man fails in railroading. When he goes, or is *sent*, to college, the average boy has not the remotest idea of what course to take. Perhaps he has a friend who enrolls in the civil engineering course. So he takes the same course to be with his friend. There are nine chances to one that, should he go into railroading after graduation, he does it in the same haphazard way that he chose civil engineering in his freshman year at college. Now, even though such a man may have ranked high in his studies at school, he cannot make as efficient a workman as the man who merely passed all subjects but chose railroading because he liked it and because the call of the rail was in his blood. No man can hope to succeed if he takes just a passing interest in his work and does not put the drive and "pep" into it that he used to see in the old football team back at college. And, if he does not like the game of railroading, he cannot put that fight into it.

Now may I ask a question? Why did the Southern Pacific do away with their training course for college graduates? James J. Hill had his "kindergarten" for college men on the Great Northern. Were not these courses a success? Surely there are being graduated nowadays college men who have the inborn desire to railroad, and who would only be too glad of such an opportunity.

A TEXAS "AGGIE."

Another Viewpoint on the Chief Clerk Question

DOWN-SOUTH.

TO THE EDITOR:

I have read with interest the articles which have recently appeared in the *Railway Age*, pertaining to the chief clerk and the relation, feeling or attitude existent between him and his superior officer. On divisions or in departments where both the officer and the chief clerk are really able men, I venture to say that any feeling of antagonism is almost entirely absent, each appreciating the value and importance of the other, with a reciprocation of confidence and esteem.

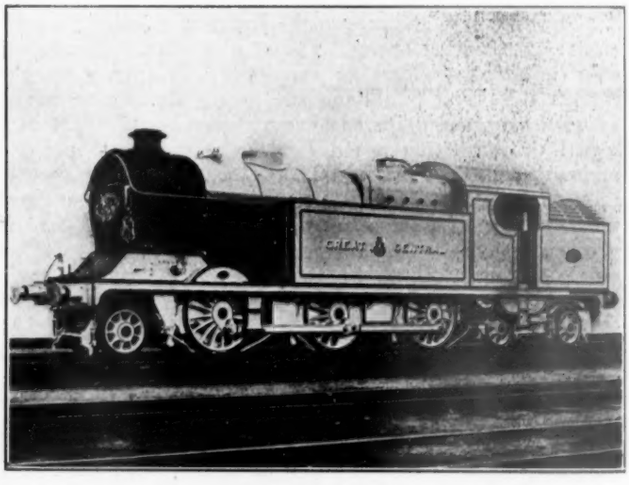
In the different letters the word "recognition" is used frequently, which I infer means that the chief clerk should be regarded as an officer, rather than one whose existence is brought into the limelight only in cases of embarrassment.

A few days since we were on the verge of an eruption of organized labor, and more than ever we heard business men discussing the problem and freely expressing their views on the subject, which were briefly, "that all railroad men are overpaid." It is admitted, in fact generally known, that certain classes or crafts are over-rated, but let's be fair and not say *all*, for a little investigation would be necessary to prove that it is not the chief clerk.

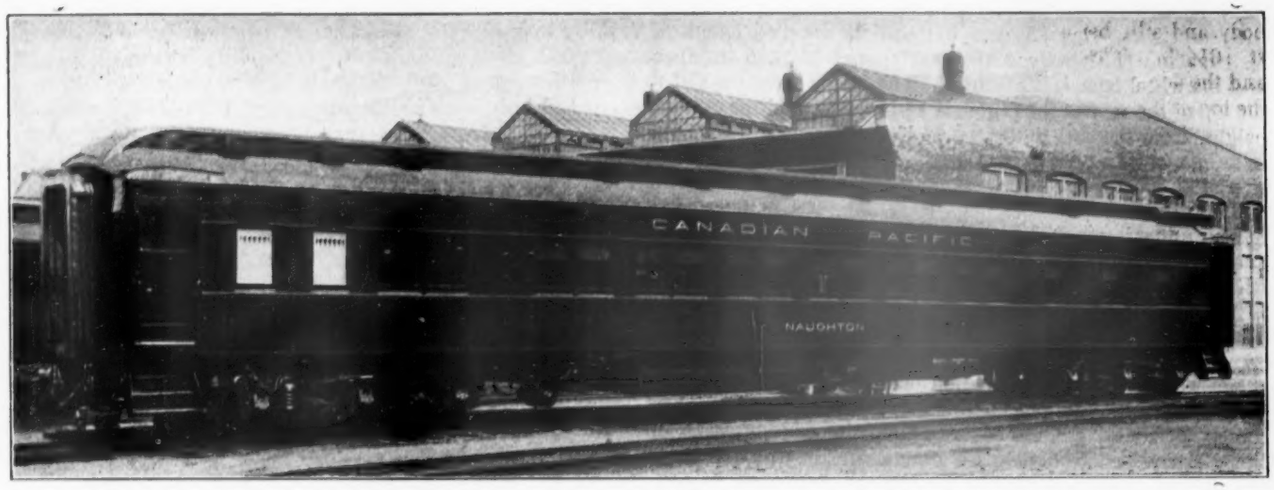
For the sake of comparison, take a car foreman and a chief clerk. In 1915 the former received $60 per month and the latter $100. Today the foreman receives $260 and the chief clerk $185. Further, the office manager in almost any commercial concern receives at least one-and-one-half times as much as a chief clerk whose duties certainly carry more responsibilities, his activity and accountability not being confined to the operation of the office alone, but on the contrary involving his passing upon matters of importance in the shop, on the division, or on the system.

Call him what you will, confine his name to the countersignature on passes, if it is felt that in this way he can best serve, but when his name is placed on the pay rolls, take into consideration that the education which he must necessarily have cost time and money, and unlike other occupations he cannot expect to be a master car builder, etc., but must continue "to serve" faithfully in his position of trust and confidence until his superior passes to broader fields, and his successor brings along "his man" as chief clerk; or perchance, opportunity knocks upon his door and takes him to some commercial firm or corporation that recognizes ability, even in office men, and compensates them accordingly.

ICH DIEN.



A 2-6-4 on the Great Eastern, England



One of the New Sleepers Leaving Angus Car Shop

New Sleeping Cars for the Canadian Pacific

Composite Cars of 12-Section and Compartment Types Have Special Facilities for Comfort of Passengers

IN HANDLING its through passenger business the Canadian Pacific is confronted with some interesting problems. The road has the advantage of a fine scenic route and with a line extending from coast to coast, is well situated to secure transcontinental passengers. On the other hand, the competition for Pacific Coast traffic is very keen. Furthermore, the prospect of the journey of 2,886 miles between Vancouver and Montreal, requiring four and one half days to complete, might seem unpleasant to inexperienced travelers. The hotels conducted by the company at intervals along the route afford an opportunity for breaking up the journey, but even so the character of the traffic demands that the passenger equipment be of the highest grade, provided with every facility for the comfort of travelers. These conditions were carefully considered by the railroad in drawing up the designs of the latest order of 12-section and compartment sleeping cars. As a result the cars have been fitted with numerous conveniences not found in the ordinary sleeping car.

Interior of the Twelve-Section Sleeper

One of the notable features of the 12-section type sleeping cars is the provision made for the comfort of women passengers. This is particularly desirable in the transcontinental service on account of the length of the runs and because the proportion of women in tourist traffic is greater than where the cars are used principally for business trips. The ladies' dressing room is unusually commodious. It is fitted with three wash stands, each of which has a light above it, and is provided with a three panel, adjustable mirror. A long mirror is also fitted in the saloon door. One of the innovations which should contribute materially to the comfort of women passengers is a couch which has been installed in the dressing rooms on some of these cars. This provides an opportunity for relaxation that would seem highly desirable in view of the somewhat uncomfortable form of the usual sleeping car seat.

The new equipment consists of 69 sleeping cars, 56 of the 12-section type and 13 of the 10-compartment type. All the cars are constructed with steel frames and wood interior finish. The frames and trucks were built by the Canadian Car & Foundry Company at Montreal and the interior fittings were applied at the Angus shops of the Canadian Pacific.

On account of the special features of the design, the 12-section sleeping cars are extremely long, the length over the

body and sills being 75 ft. 6 in., and the coupled length 83 ft. 10½ in. The truck centers are spaced 59 ft. 6 in. apart and the wheel base is 70 ft. 6 in. The height from the rail to the top of the roof at the center is 14 ft. ¾ in. and the extreme height, from the rail to the top of the heater jack, 14 ft. 6½ in. The width at the eaves is 10 ft. 1½ in. and over the side sheets 9 ft. 10 in. The average weight of the cars is 173,400 lb.

The underframe is built with a deep fish belly center sill and Z-bar side sills. The center sill has a maximum depth of 30 in. between crossbearers for a distance of 28 feet and is 15 in. deep at centerplate. The web plates are 5/16 in. thick and are spaced 16 in. apart. At the bottom they are reinforced by two 3 in. by 3 in. by ⅜ in. angles on each plate, while the stiffening at the top consists of one 6 in. by 4 in. by ⅝ in. angle placed outside each plate with the short flange horizontal. A top cover plate 30 in. wide by 9/16 in. thick extends continuously for practically the full length of the sill, the ends reaching just beyond the door posts.

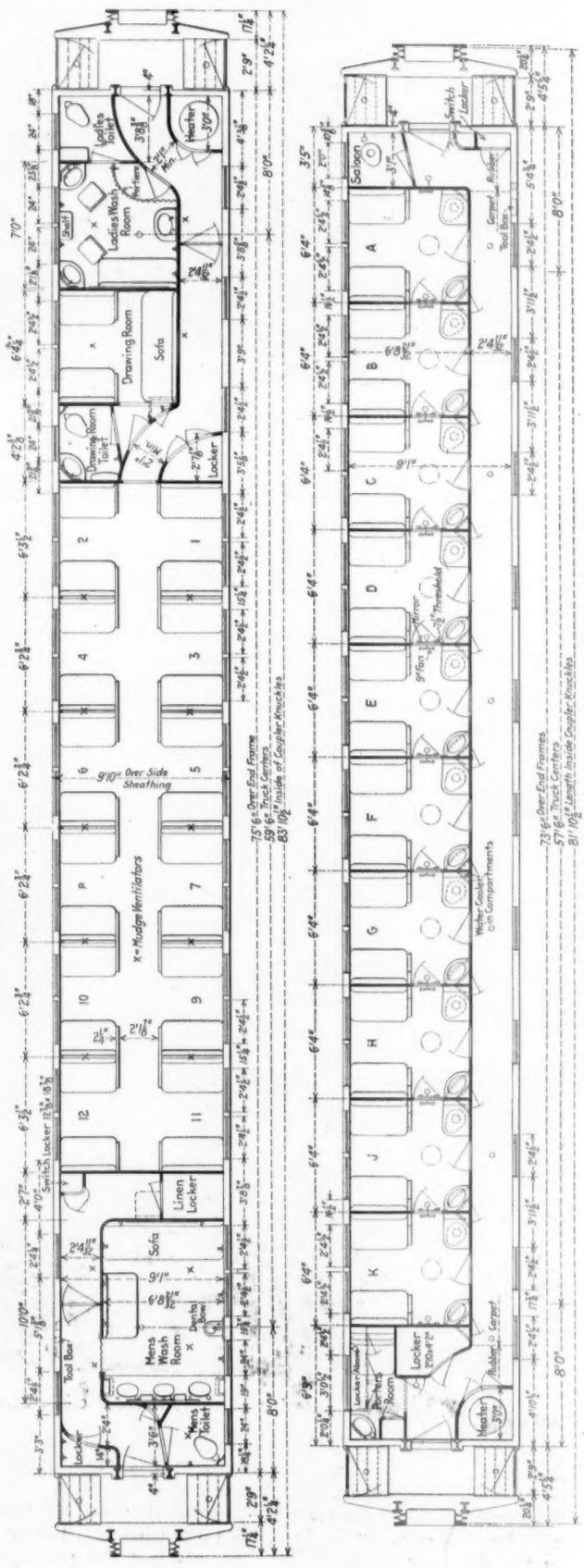
The body bolsters are of the double type commonly used with six wheel trucks, of built up construction, the two arms being 4 ft. 8 in. apart. The cross bearers, which are spaced 15 ft. 9 in. from the center plate, are also built up of pressings reinforced with angles and top and bottom cover plates,

The Dressing Room Is Designed to Insure Comfort for Women Travelers

the construction being shown in the cross sectional drawing. The floor beams are pressed from 5/16 in. plate, the spacing varying from 16 in. to 3 ft. 1⅜ in. The side sills are each made up of a 5 in. 11.6 lb. Z-bar and a 3 in. by 2½ in. by ¼ in. angle. The body end sill is a 5/16 in. pressing. An end cover plate, 5/16 in. thick and 22 in. wide, extends across the underframe at each end. At the bolsters there are also ¼ in. by 5 ft. 6 in. by 8 ft. 11 in. cover plates. The remainder of the floor is covered with 1/16 in. floor plates, which overlap the centersill cover plate on each side and fit over the floor beams and side sill.

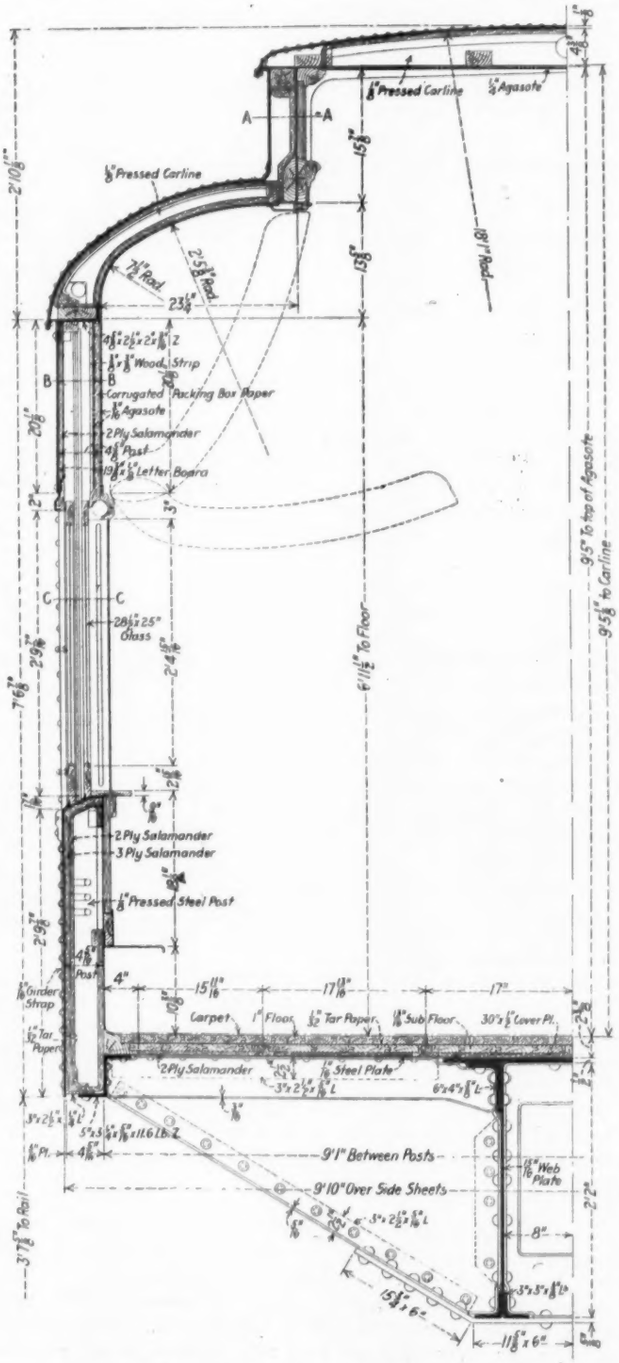
Side Frame

The side posts are of two types, those at the piers being of U-sections made right and left, the sheets being riveted to the flanges. The center pier posts are of a deeper U-section, the web being turned toward the outside of the car. The side plate is a Z-bar, 2 in. by 2½ in. by 4⅝ in. by 3/16 in. and is made continuous from end to end. The carlines are pressed of ⅛ in. steel. The lower carlines, which are continuous across the lower deck and up the side of the clerestory, are of ⅛ in. steel plate of U section, irregularly spaced at intervals of about two feet. A Z-shaped deck plate ⅛ in. thick is



Floor Plans of the Twelve-Section and Ten-Compartment Cars

fastened to the inside of the clerestory. The upper carlines are of 1/8 in. steel of Z section, 4 3/8 in. high at the center and are placed directly above the lower deck carlines wherever possible. They are riveted to the inside deck plate and to the lower carlines. The body corner posts are built up of a 3 in. by 4 in. angle forming the corner with a 4 in. by 3 in. by 3 in. Z-bar riveted to the inwardly extending flange of the



Transverse Section Through the Car Body

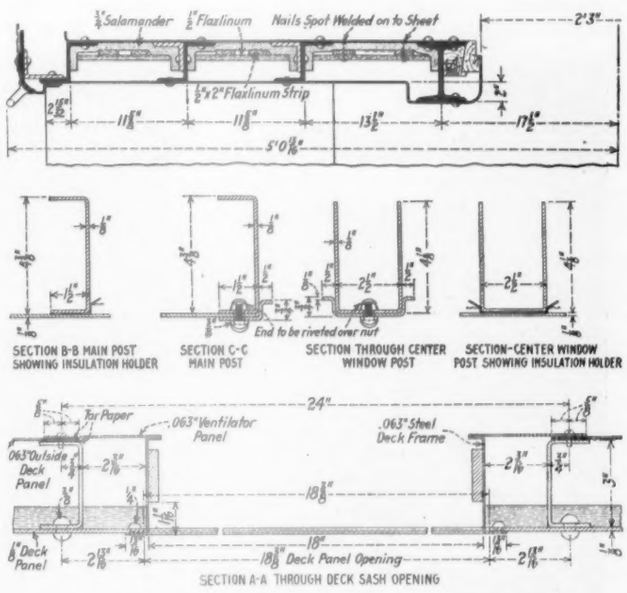
angle and forming a point of attachment for the end plates. The door posts are 6 in. I-beams to which wooden door frames are fitted. There are two intermediate posts on each side made up of 4 in. by 3 in. by 3 in. Z-bars, reinforced up to about two feet above the floor by 3 in. by 3 in. angles. The vestibule diaphragm posts are of 6 in. I-beams and are braced to the end posts of the body by 6 in. channels. The vestibule corner posts are made up of pressed steel with a wood filler.

The outside plates below the windows are 3/16 in. thick and meet the window ledge under the belt rail. The letter board and the pier plates are 1/8 in. thick and the outer deck plates 1/16 in. thick. The roof sheets are 1/16 in. thick excepting the hood sheets, which are No. 12 gage galvanized.

The exterior of the cars is finished in Tuscan red, the railway company's standard colors.

Interior Finish

The fittings in the interior of the car have been designed to give a pleasing appearance and also to afford adequate insulation for the extremely cold weather encountered in Canada. Three thicknesses of insulation are used in the side walls and two thicknesses in the roof and the deck. The method of fastening the insulation in the deck is worthy of mention. Wire nails are attached to the sheets by spot welding the heads. The insulation is driven over the nails which are then bent over. The floor has one layer of insulation over which a double wood floor is laid, except in the passageways which have rubber floors and the saloons where tile is used. Steel plates form the inside of the wall up to the seat level and a



Horizontal Sections Through the Car Body

third layer of the Salamander insulation is carried up to that point. The inside of the walls above are covered with wood wainscoting up to the lower edge of the berths. The side walls within the berths and the headlining are of Agasote. The berths, the deck molding and the interior partitions are of wood.

All the woodwork is mahogany or mahogany finished, except in the men's smoking room where either English oak or black walnut has been used. All parts above the deck molding are painted greenish gray. Little ornamentation is used. The ceiling and deck panels have a conventional border and marquetry borders are set into the berths and bulkheads. The seats are upholstered in green figured friezette plush and the carpet also is green. In the staterooms Biltmore plush is used for upholstery.

The men's smoking compartment has three wash basins, a dental lavatory and seats for six persons, upholstered in leather. The entrance to the men's saloon is from the hall instead of through the smoking room.

The cars are heated by a combined vapor and hot water system with a Frumveller heater. The main piping has separate controls for each side of the car, for the stateroom and

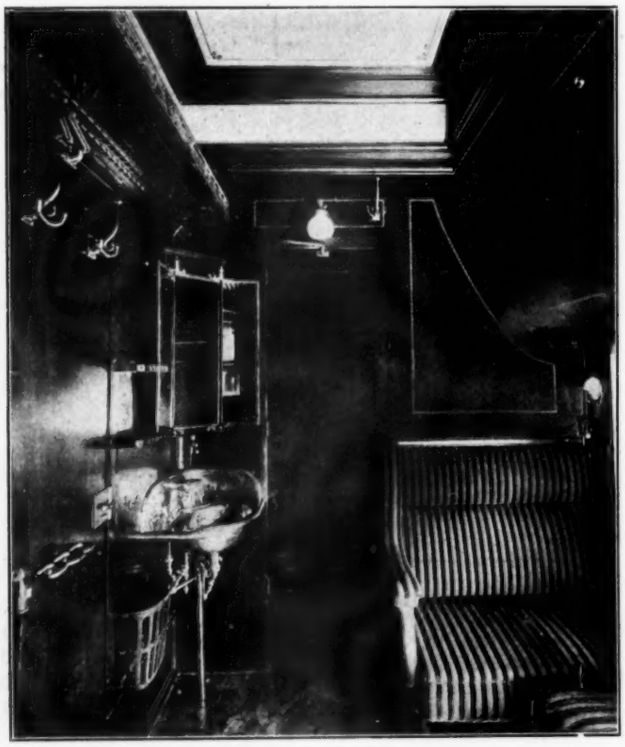
the smoking and dressing rooms. Additional heating pipes are provided which have individual regulation for each section. Twenty-one Mudge ventilators are applied to insure adequate air circulation.

The lighting systems are of the Safety and Stone-Franklin types. The batteries have a capacity of 600 ampere hours. The main lighting fixtures have semi-opaque bowls, five of this type being used over the berths and one in the stateroom. The usual arrangement of small lamps in the berths and aisle night lights is followed. The smoking room is fitted with a two-light ceiling cluster and individual lamps over the mirrors, while in the ladies' dressing room wall fixtures only are used. The conduits for the piping are set inside the walls and the roof.

The cars are carried on Commonwealth six-wheel trucks, with 5 in. by 9 in. journals, having a wheel base of 11 ft. They are equipped with steel tired wheels and clasp brakes. The brake equipment is the schedule LN1812 designed for 90 per cent braking power. Miner hand brakes are used with a sheave wheel between the drum and the brake rigging to increase the force.

Compartment Cars

In general design the compartment cars are quite similar to the 12-section sleeping cars. The body is two feet shorter



Interior of One of the Compartments

and changes have been made in the spacing of posts to fit the altered floor plan. The interior woodwork is mahogany and the upholstery is Biltmore plush. Care has been taken in fitting the compartments to afford the maximum of comfort and convenience for the passengers. Individual regulation of heat and ventilation is provided. A long baggage rack, an umbrella rack, trays and numerous hooks are facilities that will appeal to the traveler with a large amount of luggage. Space at one end of the car has been utilized for a saloon while the other end carries the heater, linen locker and porter's room.

Both types of cars are equipped with safety appliances to meet the United States and Canadian standards. The handholds are attached so that they can be removed without disturbing the car framing, flooring or lining. Other appliances include bottom operating lower couplers, Miner A5P draft gear, Acme single web type diaphragms with rubber hoods, JM expander rings, Miner buffer and Woods single roller side bearings.

Freight Car Loading

WASHINGTON, D. C.

LOADING of revenue freight during the week ended on December 17 totaled 727,003 cars, as compared with 742,926 the previous week, or a reduction of 15,923 cars, according to reports compiled by the Car Service Division of the American Railway Association. This was a reduction of 75,268 cars compared with the corresponding week last year and 79,731 cars, compared with the corresponding week in 1919.

Livestock and coke were the only commodities to show increases over the week before, the former totaling 33,861 cars, which was an increase of 1,702 cars over the week of December 10 and 3,389 cars more than were loaded during the corresponding week in 1920. Coke increased 507 cars within a week, bringing the total to 7,145.

The decrease in the total loading was due principally to a falling off compared with the week before of 12,194 in the number of cars loaded with merchandise and miscellaneous freight, the total being 449,547 cars. This was, however, 11,615 cars more than were loaded during the same week in 1920 but 18,300 less than during the same week in 1919.

Coal loadings totaled 134,842 cars, 2,994 less than the week before and more than 90,000 cars below the corresponding week last year. Grain and grain products amounted to 47,383 cars, 1,297 cars less than the week before but 12,152 cars more than during the same week one year ago and 9,839 cars more than during the corresponding week in 1919.

Shipments of forest products, compared with the week before, also fell off 1,054 cars, the total being 48,690 cars. This was, however, 1,942 more than were loaded one year ago but 3,058 less than during that week in 1919. Ore loadings amounted to 5,535 cars, a decrease of 593 cars compared with the week before.

Compared by districts, the Southern and Southwestern districts reported increases in the loading of all commodities over the week before, but all showed decreases compared with the corresponding week in 1920.

For the period ending December 15 the freight car surplus increased to 371,221, as compared with 339,532 on December 8. Surplus box cars totaled 138,214, an increase of 8,219 compared with the total on December 8, while surplus coal cars numbered 186,508, an increase of 20,445 within the same period. An increase of 1,384, which brought the total to 17,814, was reported for stock cars while there was an increase of 405 within a week in the number of surplus coke cars.

T. H. DAVIS, general chairman of the Association of Shop Craft Employees, Eastern Region, Pennsylvania Railroad, in a letter sent to all shop craft employees in his territory, says: "The railroad officials have many troublesome questions confronting them, but they have shown every disposition to try to strain a point in our favor when we were able to show them the justice of our claims; and, as co-operation is a two-sided thing, we feel that we ought to show our appreciation by helping them in every way we can. . . . What we need now is good business, to enable us to improve our conditions, and if every employee would just speak a good word for the old P. R. R., it would mean more business, and more business means more money to all of us. . . . It would be a very short time until the Pennsylvania could pay better wages and have better conditions than any other railroad in America." . . .

The Railway Situation and General Business*

Why Premature Reductions of Rates Will in the Long Run Cost Shippers Far More Than They Will Benefit Them

By Samuel O. Dunn
Editor of the *Railway Age*

I HAVE COME to talk to you about a condition of affairs which should be known and given grave consideration by every farmer, business man and public man. This condition is a serious maladjustment in the relations between the railroad system of the country and its industrial, commercial and financial systems. For over ten years, and especially within recent years, the capacity of our industries for producing commodities, the capacity of our commercial concerns for marketing them and the capacity of our financial institutions for financing their production and marketing, have been rapidly outgrowing the capacity of our railways for transporting them. If we follow that road much longer we shall all participate in a disaster which the exercise of ordinary intelligence and foresight would avoid.

The pessimist is always unpopular. He is never less popular than in a period of business depression and losses, of widespread unemployment and suffering, such as the present. In such times the man who is heard gladly is he who essays to tell how we may escape from the conditions immediately oppressing us, and who speaks cheerfully about the early future. No man can hope to ingratiate himself with busy people whose time he takes to paint gloomy pictures of evil developments which seem sure not to occur for some time, and which most of those who hear him may believe will never occur at all.

But every successful man in his own business looks farther ahead than the next few months, otherwise he would not succeed. Likewise, if our people as a whole are to be successful in their business as a whole and after the present depression are to enjoy a period of prolonged prosperity, they must look farther ahead than a few months. Now at present the railways could handle much more business. But you know why that is. The amount of traffic offered to them depends on how much production and commerce are being carried on by other concerns; and the production and commerce being carried on now are abnormally small.

The conditions to which this is due will soon pass—in fact, are passing. On that point I can speak as optimistically as anyone. Just when a substantial revival of general business will occur few would venture to predict. That it will come comparatively soon almost everybody who speaks with any authority does predict.

Great Shortage of Transportation Probable

The question I urge business men to consider now is the effect the railroad situation probably is going to have when this improvement in general business does come. We have always had a great revival of business after every period of profound depression in the past. We never had such a revival of business which did not result in the railways being offered a much larger traffic than they had ever handled before. In almost every such period we have had traffic congestions and large "shortages of cars," as we have called them, because the railways met difficulty in handling the increased business. If we judge by what has been done and not done in the railroad and other businesses within recent years, and by what is being done and not done now, we must conclude that the losses caused by transportation conditions in the next period of active business will exceed all the losses that ever were caused by such conditions in our past history.

If you are sceptical, as I suspect many of you are, as to whether this prognostication of evil is based on facts, let me recall some recent history. Have you forgotten what occurred in 1917 and 1918? We entered the Great War in 1917. Under its stern stimulus the productive activity of the country was raised to the highest pitch, and it was speedily found that although they handled more traffic than ever before the railways could not handle all that was offered them. In 1918, under government control, the amount of business taken by the railways was constantly restricted by the policies of the Fuel Administration in limiting the amount of coal that "non-essential" industries could have, and of the Railroad Administration in making use of embargoes to prevent freight from coming too fast. Again, in the latter part of 1919 and almost throughout 1920 there was constant complaint from shippers that the railways were unequal to the demands, although then also they were handling more traffic than ever before. You can hardly have forgotten that in 1920 there was great alarm lest the amount of coal produced and transported would be insufficient for the country's needs. To prevent a coal famine the Interstate Commerce Commission issued an order giving priority in the use of open top cars to coal over all other commodities. The result was that construction work of all kinds was seriously interfered with.

These and other facts that could be mentioned show that during most of the four years from 1917 to 1920 the capacity of the railways proved unequal to the demands of commerce. Why was this? It was because for some years their development had been slowing down, while that of other industries had been going forward with unprecedented rapidity. In the seven years ending with 1913 the total freight handled by the railways increased 39 per cent. In those years they increased the number of their freight cars by 315,000, and the number of their freight locomotives by 8,100. In the seven years ending with 1920 the freight handled increased 38 per cent, while the number of freight cars increased only 143,000, and the number of freight locomotives only 4,200.

Why did the development of the railways slow down while that of other industries was accelerating? It was because the amount of new capital invested in the railways greatly declined, while the amount invested in other industries greatly increased. This, in turn, was due to the fact that different classes of our business concerns were dealt with so differently by our state and national governments that while the profits of the railways increased very little those of other classes of concerns increased enormously. In the three years ending with 1911 the net income of the railways, after paying interest and taxes, averaged $430,000,000 a year. In the next three years it declined. In the three years ending with 1917 it averaged $558,000,000, or 30 per cent more than in the three years ending with 1911. The government guarantees while they were under government control were based on their net return in the three years ending with 1917. Therefore, for purposes of comparison it is fair to say that their net income in the five years ending with 1919 averaged 30 per cent more than in the three years ending with 1911.

*An address delivered on December 16, before the Lions' Club, and Chamber of Commerce at Dallas, Tex.

Since the value of the dollar had greatly depreciated, this increase in net income, measured by what it would buy, really was a decline.

Vast Profits in Other Businesses

What was occurring, meantime, in other lines of business? The returns of all the corporations of the United States to the Bureau of Internal Revenue show that in the three years ending with 1911 their net income, after paying interest and taxes, averaged a little over three billion dollars a year. In the three years ending with 1914, while railway net income declined, the net income of other corporations increased. In the five years ending with 1919 the net income of all corporations averaged seven billion dollars a year, an increase of 120 per cent, or four billion dollars a year.* This increase in net income for that five years aggregated twenty billion dollars—an amount exceeding the valuation placed by the Interstate Commerce Commission upon all the railways of the United States in the great rate case last year.

I do not criticise these vast profits of general business. I cite them in contrast to those of the railways merely to show there was such a large difference in profits in the railway and in other industries during these years as made it inevitable that the development of other industries should far outstrip that of the railways. Some indication of how much greater the development of other industries was than that of the railways is given by statistics regarding the amounts of securities issued. In the three years ending with 1914 the total amounts of securities issued by railroad and industrial corporations were about the same, being for each about two and a quarter billion dollars. On the other hand, in the three years ending with 1920 the total securities issued by the railways were less than a billion dollars, while the total issued by industrial corporations exceeded six billion dollars.

Can Other Industries Produce to Their Capacity?

Can anybody reflect upon such facts without being apprehensive as to what will occur when business revives again and the industries of the country begin to try to produce to their capacity? We shall be confronted with a situation the like of which never existed. We shall have a system of railways the capacity of which has been within the last ten years, and especially within the last five years, increased relatively less than at any time since the first rail was laid. We shall have productive industries whose capacity probably has been increased relatively more within those same years than ever before. How can we draw any conclusion other than that when that time comes the traffic offered to the railways will far exceed what they can handle? But the amount of production and commerce that can be done depends on the amount of farm products, of fuel, raw materials and finished products that can be transported; and for transportation we are chiefly dependent on the railroads. Therefore, instead of being able to operate and produce to their capacity, the industries of the country will have to limit their production to the basis of the amount of traffic the railways can handle. But the vastly increased investment which has been made in these productive industries has been made on the assumption that they will be able to produce to their capacity. If they are not able to do so they will not be able to earn a return upon all the great investment which has been made in them. Prolonged inability of our productive industries to utilize a large part of their productive capacity would cause disaster to many of them and to many of our commercial and financial institutions.

Is it not plain there is a real danger in this situation for all of us? If there is a real danger in it, what should be done to avoid it? It would seem the only effective thing that can be done is to give the development of the railways a chance to catch up with the development of other industries. That, in turn, cannot be done in any way under private ownership except by allowing them to earn a net return sufficient to attract more investors. You know as well as I do that no large new investments are now being made in the railways. In the interest of the public welfare they should be strenuously engaged in increasing their facilities. They are doing nothing of the kind because since they were returned to private operation the percentage of net return they have earned has been the smallest in over 30 years, and they have had to retrench in every way to earn that.

Perhaps you will agree that the railway situation menaces the future prosperity and welfare of the country, but you will add that it is the fault of the railways themselves that within recent years they have not earned larger profits and got into better condition, physically and financially. You may say they would be all right if they had been as efficiently managed as other concerns. There are, however, certain facts which demonstrate that the difference between the profits made by the railways and by other concerns within recent years have not been due to differences in management. These facts have a very direct bearing upon the high rates of the railways which are now the objects of so much attack.

Great Increases of Prices Explain Profits

The statistics of the Interstate Commerce Commission show that the average freight rate in this country steadily declined until it reached the lowest point in history in the years 1916 and 1917. On the other hand, the statistics of the Bureau of Labor show that in the years 1916 and 1917, before there had been any advance in freight rates throughout the country, the average wholesale price of all commodities was 70 per cent higher than in the years 1900 to 1910. There were large general advances of freight rates in 1918 and again in 1920. But even the advances granted in 1920 made the average railway rate only 70 per cent more than it was in the years from 1900 to 1910, while in 1920 the average price of all commodities was 175 per cent more than in the years 1900 to 1910. There can be no disguising the fact that the enormous increase in the profits of other industries from 1915 until the present severe depression began was due mainly to great increases in prices; or the further fact that the failure of the railways to participate in these large increases in profits was due to rigid systems of government regulation and government control which made it impossible for them to increase their rates and profits when other concerns were so greatly increasing theirs.

After this long period of years when the railways were restricted to net returns which were positively beggarly compared with those made in other lines of business, and when in consequence the development of the railways fell far behind that of other industries, we might not unreasonably expect to find the farmers and business men of the country unitedly demanding a government policy in dealing with the railways in future which would insure rapid and adequate increases in their capacity. And what do we find? We find ourselves in the midst of a great agitation for general reductions of freight rates which is supported by the argument that the present rates are so high that they are insupportably burdensome to business. We see numerous bills being introduced in Congress to repeal all the provisions of the Transportation Act which were adopted to reform the restrictive and destructive system of railway regulation we had before the war. We have had even the spectacle presented of large business interests threatening to ask Congress to pass legislation to compel the railways to reduce their rates, if they did not voluntarily reduce them, without the reasonableness of reductions being first passed on by the Interstate Commerce Commission.

A stranger to the facts would infer from what is being widely said and published that the present rates of the rail-

*These statistics regarding net income of all corporations are based on data given by Prof. David Friday in his recent very illuminating and valuable book, entitled "Profits, Wages and Prices," page 15.

ways are relatively very much higher than the present prices of most commodities. And what are the facts? In July, 1921, the latest month for which we have complete statistics, the average freight rate per ton per mile in the entire United States was 65½ per cent higher than the average rate from 1900 to 1910, while the average wholesale price of all commodities was 66.7 per cent higher than the average wholesale price of commodities in the ten years from 1900 to 1910. Are the present rates unreasonably high in proportion to prices in general? Are they so high that they are really preventing the movement of traffic? The present average freight rate is almost exactly as high in proportion to the present average wholesale price of commodities as it was in the years 1900 to 1910; and in those years the industrial activity and the prosperity of the country were so great that the total freight handled by the railways increased 80 per cent. Since the traffic of the railways increased 80 per cent when the relations between the average railway rate and the average wholesale price of commodities was almost exactly the same as now, how can it be rationally contended that the present relationship between rates and prices is so burdensome that it is preventing a revival of business?

Most Commodity Prices Still Higher Than Rates

As a matter of fact, however, the present relationships between railway rates and the prices of individual commodities are not the same as from 1900 to 1910. There are some commodities, such as farm products and metals and implements, the present prices of which are relatively much lower compared with freight rates than they were then. On the other hand, the average prices of those things which the Bureau of Labor classifies as cloths and clothing are 93 per cent higher than then, of fuel and lighting 98 per cent higher, of drugs and chemicals 82 per cent higher, of lumber and building materials 130 per cent higher, of house furnishings 147 per cent higher, and of miscellaneous commodities 72 per cent higher. Is it fair to say it is high railway rates that are imposing an insupportable burden on business when the average prices of most important groups of commodities are still higher in proportion than the railway rates charged for transporting those same commodities?

I do not attack the present prices of any commodities. Perhaps there is justification for all of them. I am not defending all the present railway rates. Many of them are too high and should be reduced, and since the last general advance in 1920 many rates have been reduced, some under irresistible political pressure from Washington, and some to enable the railways to move traffic which they otherwise would not have had a chance to move. When it is said, as it frequently is said, that the railways ought to reduce all their rates in their own interest, because if they would reduce them they would get to handle more traffic and make more money, there is attributed to railway officers too little knowledge of and interest in their own business. They are more anxious than anybody else to increase net earnings; and they are quite as able as anybody else to decide what changes in rates will increase net earnings. They can be relied on to reduce as rapidly as possible every rate whose reduction will increase net earnings.

Our Most Important Railroad Problem

But from the standpoint of the farmer, the manufacturer, the merchant, the banker, the working man and every other class of our people the most important question regarding the railroads at present is not whether, by how much, or when, their rates should or will be reduced. Our most important problem affecting the railroads is that of devising and carrying out of a policy which at the earliest possible time will cause a renewal on a large scale of increases in their capacity. An immediate general reduction of rates might confer temporary benefits by temporarily stimulating general business. But it would inevitably make the net operating income of the railways less than it otherwise would be. That would postpone the time when the railways could begin rehabilitating and enlarging their facilities.

Because the capacity of the railways was inadequate in 1920 many farmers could not get their grain to market when grain prices were high. The coal operators complained they could not operate their mines to capacity because they could not get enough cars. Construction concerns complained bitterly because the giving of priority in the use of open top cars to the coal operators made it impossible to do all the construction work they wanted to do. The manufacturers had to send hundreds of thousands of automobiles over the country under their own power because the railways could not haul them. The railways already are increasing their purchases of equipment; and rates which will enable them to maintain and increase their net returns will enable them to increase their capacity so that when a revival of business comes they will at least be less unequal to the demands than they would be if premature reductions of rates were made. On the other hand, if premature general reductions of rates are made the railways will be unable even to start to reduce the great disparity between their capacity and the productive capacity of the country's other industries. Therefore, premature general reductions of rates seem as certain, by preventing increases in the capacity of the railways, to prepare the way for a very serious crisis in the relations between our transportation system and our industrial, commercial and financial systems when general business revives as anything that could be done. What will it profit the farmers and business interests to secure comparatively small reductions in their rates and comparatively small increases in the business done by them now, if these transient benefits are obtained at the cost of far greater losses extending over much longer periods?

The other business interests of the country are far better able to stand the present rates than the railways are to stand general reductions of them. The other business interests have suffered heavy losses during the present depression, but so have the railways. And while other business interests entered this period after having earned for over five years a net income more than twice as great as before the war, the railways entered it after having during those same years received a net income which, by comparison, was very little greater than before the war. When you are disposed to say that railway rates should go down along with prices, do not forget that prices were increased long before rates were, and that when rates had been advanced a maximum average of 70 per cent the average wholesale prices of all commodities had been advanced 175 per cent.

How to Get Rates Down

While premature general reductions of rates would be immediately disastrous to many railways and in the long run would be harmful to business of all kinds, it cannot be questioned that in future the general tendency of rates should be downward, although this is equally true of the prices of many commodities. But these reductions of rates, in the interest not only of the railways but of the entire nation, should be preceded, or at least accompanied, by corresponding reductions in railway operating costs. Much the largest part of railway operating expenses consists of the cost of labor. Compared with the present costs of living and the wages now being paid in other industries, the wages of most railway employees are too high. The railways are preparing to ask the Railroad Labor Board for a further reduction of wages. But the Labor Board is a government body. As such it represents the public. Therefore, indirectly, the labor costs imposed by it are imposed by the public. Farmers and business men are a majority of the public. Therefore, indirectly, the farmers and business men determine the largest part of

the operating expenses of the railways. Have they any right to complain against the managements of the railways if, through the Railroad Labor Board, they themselves impose labor costs on the railways which make it necessary to maintain relatively high rates? The public's recourse, if high labor costs compel high rates, is not to the railway managers, but to the Railroad Labor Board and to the Congress under whose legislation the Railroad Labor Board acts.

Another of the very largest items of railway expenses is the cost of fuel. This item is, and for many months has been, excessive because of the high prices of coal. The high prices of coal have been mainly due to the high wages of the miners. The present wages of union miners were fixed by a government commission to remain in effect until March 1, 1922. The railways are not responsible for high freight rates in so far as they are due to high prices of coal.

Since the present rates were made necessary, and since their continuance has been made necessary chiefly by high labor costs and high prices of coal, the railway managements have a right, and it is their duty, to say to the farmers and business interests that they must help to secure reasonable reductions of railway operating costs if general reductions in rates are to be made under conditions which will not in the long run injure more than they will benefit the farmers and business interests themselves. And in this connection it is relevant to point out that the Railroad Labor Board, in fixing wages, is required by law to consider the cost of living; that the cost of living is mainly determined by the general level of prices; and that the present high prices of some classes of commodities and the high rentals in our cities are the principal obstacles to securing a really large further reduction of railway wages.

Government Regulation Centers Attacks on Railroads

We are in the midst of a period of severe and even violent readjustment of business and economic conditions. This readjustment has been made necessary by the war. The war caused enormous increases of prices and wages and temporarily created new relationships between different classes of industrial, commercial and financial enterprises. It was inevitably followed by a period of worldwide depression which has caused great reductions of prices and wages, and is establishing still other new relationships not only between the industries and commerce of different nations, but also between different classes of industrial, commercial and financial concerns in our own country. Today those in all lines of enterprise are struggling fiercely not only to minimize immediate losses, but also to put their various houses in order so that after the present period of stress and distress they may again do a large business and make large profits. In this period of struggling back to "normalcy" the railways have peculiar difficulties to contend with. They have to work through it without being able to draw upon large surplus profits made during the war years. They have to work through it with every rate they can charge subject to regulation by government bodies, and with the wages and working conditions of every one of their employees controlled by a government body. The managers of other business concerns are comparatively free to use such means as they see fit for getting out of their difficulties. The railways must use such means as government authorities will permit. Unfortunately, also, the very circumstance that their rates and wages are regulated by the government concentrates upon them pressure and attacks of a kind from which most other business concerns are exempt.

The policies that the government bodies which regulate the railways will adopt and follow will depend mainly upon public sentiment. If public sentiment demands that railway rates and wages shall be regulated largely regardless of both the immediate and later effects upon the net return the railways are able to earn, the capital they can raise and the extent to which they can prepare for rendering adequate service, then rates and wages will be so regulated. On the other hand, if public sentiment demands that both railway rates and wages shall be regulated with due regard to the net returns that the railways can earn, and to the effects that will be produced in the long run upon the service they can render to the public, rates and wages doubtless will be so regulated. Public sentiment in this country is omnipotent, and in the long run, regardless of statutes and courts, dictates the policies followed by the government in reference to any industry over which the government extends its regulating authority. Therefore, the farmers and business men of the country can call the tune to be played by government regulation. They can call a tune which will prevent or one which will cause revival of the development of the railways. In reaching a decision as to what tune they shall call, however, they should not overlook one fact of very great importance to themselves. This is, that those who call the tune will finally have to pay the piper, and that upon what tune they call will depend how large the piper's bill will be.

It is hard to believe a people who have used so much sagacity and foresight as the American people have in respect to many other great matters should persist in using so little sagacity and foresight in dealing with the railroad problem as they have used thus far. Surely we have learned too well the costly lessons taught by our experience with government regulation and government control to renew the policy of railway restriction, and even confiscation, which we systematically pursued for years, and which we so gladly and even enthusiastically abandoned when we passed the Transportation Act. If we return to the old pre-war policy of constantly restricting the railways to the lowest rates and least earnings which the courts will not declare confiscatory, we had just as well reconcile ourselves to the expectation that sooner or later private ownership and management of railroads will fail and the public will adopt government ownership and management or Mr. Plumb's famous plan: it will do so from sheer desperation and disgust at the natural and unavoidable results of its own mistaken and short-sighted regulation.

This railroad problem is not merely the railroads' problem. In a much more real sense it is the public's problem. Government regulation makes it necessary for the public to participate in solving it, and the public will be injured or benefited much more by the way it is solved than the owners and managers of the railways. It will never be solved right until business men direct their influence upon government regulation by the same intelligence and foresight that they use in managing their own affairs. If business men ever do apply to the railroad problem the same intelligence and foresight that they use in solving the problems of their own businesses. Then, and not until then, will the railroad problem be solved and solved right.

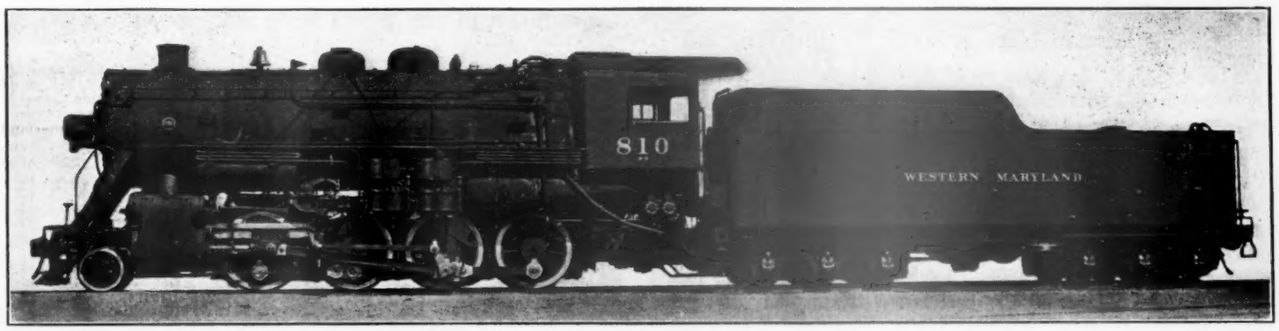
Miss A. I. Dewar, operator for the Canadian Pacific at Heron Bay, Ont., finds her name in the general superintendent's "educational" (discipline) record for November, with 25 merit marks for special efficiency on a very cold night. She received a telegram at 11:15 p. m., addressed to a man who was hunting four miles out in the bush, advising him of the death of his brother, in Port Arthur. She, when relieved at midnight, took the message and, accompanied by her sister, braved the dangers of a lonely tramp through the bush, in which wolves could be heard, and walked the four miles, the mercury at the time standing at 5 degrees below zero. By her prompt action the recipient of the telegram was enabled to take train No. 1 to Port Arthur before morning. Whether or not the Ottawa government, like that at Washington, has men out hunting for chances to impose penalties (on the railroad, not on the operator) when telegraphers work overtime, is a point on which no information is given.

Western Maryland 1921 Net in Sharp Contrast

Almost Back at Pre-War Level—Turn-Around Operation Saves 50 Per Cent in Time of Tonnage Trains

THE ANNUAL REPORT of the Western Maryland for 1920 was issued to the public on Monday, December 5. The meat of the report is largely contained in the concluding remarks of Lawrence Greer, chairman of the board. The statement says:

The plans of the company, interrupted during the period of federal control, for the establishment and maintenance of its railroads as an efficient transportation system of modern type, were resumed upon the restoration of private operation, and have been followed during the present fiscal year and since its close. To this end, particular attention has been directed toward the enlargement of the terminal facilities at Baltimore through the acquisition of additional contiguous property, the completion of a new steel coal pier with modern mechanical unloading apparatus, the substantial expansion of storage and handling facilities at the grain elevator at Port Covington, and the acquisition of steel carfloats of large capacity for service in Baltimore harbor. The transportation capacity of the property has also been increased by the addition of 40 Consolidation freight locomotives, and attention has been given to the maintenance of track and structures so that, with the return of normal business conditions, every department of the transportation system may be properly equipped to provide efficient service for the handling with economical results of the business which may be offered.



One of the Heavy Consolidation Locomotives Which the Western Maryland Is Using in the Turn Around Service Between Hagerstown and Cumberland

These locomotives are among the heaviest of their type ever built. They have 27 by 32 in. cylinders, a total weight of engine of 294,900 lb. and of 565,000 lb. including the tender. The weight on drivers is 268,200 lb. and the tractive effort 68,200 lb. The tender, which has six-wheel trucks, carries 15,000 gallons of water and 16 tons of coal. Built by the Baldwin Locomotive Works.

Results of Operations in 1920

The annual report of the Western Maryland is issued so late and the changes have been so great in the period which has intervened since the close of the year with which it deals, that interest lies less in the details given in the report than in the operating results which are being secured at present. In 1920, nevertheless, the road handled a record business. It moved 18,335,345 revenue tons of freight and its revenue ton-miles totaled 2,289,370,222. The best previous year was 1918 when 17,156,884 tons were moved and the ton-mileage totaled 2,183,961,077. The average haul in 1920 was 125 miles; in 1918, 127.

The property in 1920 had a net railway operating income of $675,975, which figure was as large as it was because of a large credit per diem balance. The 1920 net compared with deficits in 1918 and 1919, during the federal control period. For purposes of comparison also it may be noted that the standard return based on the results for the three years ended June 30, 1917, was $3,079,593. The corporate income account for 1920, including government rental for January and February and the guaranty for the following six months, showed a net for the year of $57,735, including an item of $1,000,000 partial payment on account of the guaranty, but not the full amount accrued. This compared with the net corporate income in 1919 of $231,665; in 1918, of $342,527. There is a wealth of interesting detail in the annual report and a perusal of it will give a complete story of what the road has been doing month by month since the beginning of 1917. The comparative tables showing the cost of locomotive performance per 100 miles run, etc., for the years 1917 to 1920 and the detailed figures relative to maintenance for the years 1912 to 1920 will be found especially interesting.

Present Monthly Net About $250,000

Immediate interest in the railroad lies naturally in what the carrier is doing at present. The figures for operations in 1921, so far as they are available, afford an interesting study in contrasts as compared with 1920. At present the road's net railway operating income is running at the rate of over $250,000 monthly and has been running at that rate all the year. The net railway operating income for the first ten months of 1921 has been $2,512,328 as compared with a deficit of $235,085 in the first ten months of 1920. The traffic handled this year has been considerably below that of last year. The latest figures available as this is written are those for September. The net ton-miles in the first nine months of 1921, including both revenue and non-revenue freight, totaled 1,355,688,000. The figure for the first nine months of 1920 was 1,703,157,000. In October the road's operating ratio was 73.6, for the ten months it was 79.5. An even more interesting figure is the transportation ratio; the figure for the first ten months of 1921 was 37.4. The few roads that have been able to better that figure are the ones that are inclined to feel most optimistic about present railway conditions.

Coal Traffic 60 to 65 Per Cent

The Western Maryland operates 804 miles of line of which 114 is trackage rights. The main line extends from Baltimore to Connellsville, Pa., where connection is made with the Pittsburgh & Lake Erie, thereby supplying a route to Pittsburgh. Another important line extends from Cumberland to Elkins, W. Va., and a third from Hagerstown to Shippensburg, Pa., where traffic is turned over to the Phila-

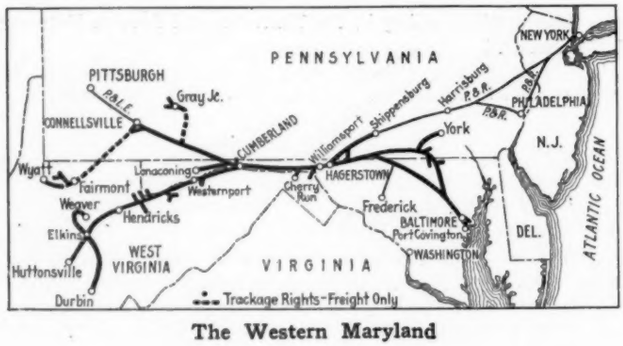
delphia & Reading. The road's most important traffic is bituminous coal, the percentage of that commodity to the total traffic averaging about 60 to 65 per cent. This coal is obtained from the Somerset, Georges Creek, Gauley and Fairmont fields. The Somerset and Fairmont fields are served by lines operated but not owned by the Western Maryland; connection with them is secured through trackage rights over the Baltimore & Ohio. The larger part of the coal is moved eastward, principally to Baltimore. A considerable tonnage moves via Shippensburg, Pa., and thence over the P. & R. including the sizeable quantity received from the B. & O. at Cherry Run. So important is the movement via Shippensburg that the Western Maryland and P. & R. have worked out a method whereby locomotives of either road are used between Hagerstown and Harrisburg.

Capacity of Grain Elevator to Be Doubled

The Western Maryland has extensive tide-water facilities at Port Covington, Baltimore. These include a new coal pier, a large grain elevator, etc. The road handles a considerable quantity of grain, received principally from the Pittsburgh & Lake Erie at Connellsville. The present elevator has a capacity of about 1,500,000 bushels. So fast has the grain traffic grown in recent years that the road has had to expand its grain handling facilities. Contracts have just been let for additions which will about double the capacity of the present elevator at Port Covington.

Making Human Nature Work for the Railroad

The Western Maryland in 1920 had a revenue train load of 1,064 tons, this comparing with 909 in 1917, 956 in 1918 and 985 in 1919. The road is required to use helper engines on every operating division in one direction and on all but two divisions in both directions. One of the busiest divisions is that from Cumberland to Hagerstown. It is on this division that the road has worked out what the officers describe as a method of "Making human nature work for the railroad." The district in question is 80 miles in length. Trains are handled to Williamsport, 73 miles



The Western Maryland

up a grade of 0.3 per cent with a single Consolidation locomotive—one of the heaviest of its type in use. From Williamsport to Hagerstown, 7 miles, a helper is required to assist the train up a 1.1 per cent grade. The line is single track and equipped with automatic block signals operated on the absolute permissive principle, under which the block sections for opposing movements extend from siding to siding, and for following movements the block extends from signal to signal. All train dispatching is by telephone. In the automatic block section territory Form 19 train orders are used to restrict the rights of trains where formerly 31 orders were used exclusively for this purpose. The difficulty in stopping and starting 100-car trains without damaging draw bars was very great. By delivering train orders without stopping the train a great deal of damage and delay was eliminated with a marked improvement in the facility of operation.

The following details concerning the operation of this division have been supplied by an officer of the road: Prior to the calendar year 1919, tonnage freight trains were handled between Hagerstown and Cumberland by dispatching the crews from their home terminal at Hagerstown to Cumberland and tying up for rest at Cumberland. When the crews' rest was up and they were available for service, they were called for the first tonnage train leaving Cumberland for Hagerstown.

This plan was objectionable due to the fact that the men were required to take their rest away from their home terminal and frequently there resulted considerable terminal delay to the Hagerstown crews, after their eight hours' rest was up at Cumberland, before an eastbound tonnage train was ready to start the return movement to Hagerstown. Naturally the men would prefer spending their spare time at home rather than at a distant terminal, and their expenses would also be less if the service could be arranged so that they could return promptly upon arrival at Cumberland.

Operation Before Adoption of Turn-Around Service

The following statement shows by months the average time on duty for all tonnage trains operated from Hagerstown to Cumberland, and Cumberland to Hagerstown for the calendar year 1918, which indicates the results before the turn-around service was made effective:

Calendar year 1918	Average time on duty westbound to Cumberland Hrs.	Min.	Average time on duty eastbound to Hagerstown Hrs.	Min.	Average total time on duty for round trip between Hagerstown and Cumberland Hrs.	Min.
February	14	30	14	30	29	05
March	14	12	12	06	26	18
April	12	37	11	36	24	13
May	12	17	10	56	23	13
June	11	56	12	07	24	03
July	12	25	11	44	24	09
August	12	33	13	08	26	01
September	12	57	13	46	26	43
October	12	55	13	04	25	59
November	12	59	12	17	25	16
December	14	00	14	23	28	23

When the turn-around service was started, it was found that by close co-operation between the Hagerstown and Elkins division trains would not be started westbound from Hagerstown until such eastbound tonnage was available at Cumberland to permit of a quick turn-around upon arrival of the crew at Cumberland.

After the train reached Cumberland on the westbound movement the engine was sent to the engine terminal and relieved for 1 hr. 30 min. for the purpose of cleaning the fire, ash pan, and also furnishing the necessary fuel, water, sand, and supplies. The crew was relieved for this period and used the opportunity to rest and eat.

Time Reduced One-Half

The turn-around plan has been in operation since 1918, and by months to date, since January, 1921, the following statement shows the average time on duty, eastbound and westbound, in handling the same character of traffic by turn-around service that was formerly moved by tying the crews up at Cumberland for rest:

Calendar year 1921	Average time on duty westbound to Cumberland Hrs.	Min.	Average time on duty eastbound to Hagerstown Hrs.	Min.	Average total time on duty for turn-around trip between Hagerstown and Cumberland Hrs.	Min.
January	7	57	10	06	18	03
February	7	30	9	12	16	42
March	6	54	8	31	15	25
April	6	48	7	44	14	32
May	6	36	7	36	14	12
June	6	13	7	09	13	22
July	6	10	7	14	13	24
August	6	13	7	33	13	46
September	6	27	7	43	14	10
October	6	47	7	47	14	34

In all of the figures given above the total time on duty includes the initial and terminal delay as well as road time. In cases where the trains do not turn, on account of engine failures or for other reasons, the total time on duty is included so that the figures represent the actual facts. The reduction of approximately one-half as between the old method and the new will indicate the manner in which the crews work to get their trains over the division in both directions. It shows the result of "Making human nature work for the railroad."

A Record Performance

The best performance of record was made during June, 1921, when the following results were obtained for the month:

Average time on duty westbound	6 hr. 13 min.
Average time on duty eastbound	7 hr. 09 min.
Total average time on duty	13 hr. 22 min.
Average eastbound loads handled per train	94
Average actual gross tons handled per train	6,186

An arbitrary limit of 100 cars or 7,000 actual gross tons eastbound is in effect.

The best performance for the month of June was by Western Maryland Consolidation engine 803 as follows:

Train consisted of	100 loads
Actual gross tons handled	7,312
Actual time on duty eastbound	6 hr. 19 min.
Distance run	80 miles

Agreement on Reorganization of French Railways

Private Companies to Work Under Joint Financial Arrangements with Dividends Guaranteed

By M. Peschaud
Secretary, Paris-Orleans Railway

THE REORGANIZATION of the French railways has at last been accomplished by the passage of the Railway Act by the French Parliament. The promulgation of the act was a difficult proposition in view of the complexity of the situation in which the railways found themselves after the war. The problem has been solved by retaining the operating concessions of the private companies with certain revisions to meet the new conditions. All surpluses, after payment of guaranteed dividends, are to pass into a general fund for the benefit of all roads and increases in dividends are only possible by a "management premium" based upon efficiency of operation.

The present mileage of these principal lines is as follows:

	Miles
Paris, Lyons & Mediterranean	6,078
State	5,599
Paris-Orleans	4,844
Est	3,071
Midi	2,546
Nord	2,358

Since the war France has also acquired the Alsace-Lorraine railway system, in the north, which is being run, as a second government railway.

Present Organization

All of the above railways, except of course the State, are operated as incorporated joint stock companies under certain concessions which will expire between 1950 and 1960. At the end of that time they will be turned over to the government on payment by the government of an indemnity covering rolling stock, stores and other movable property. At the same time the government has the right to take over the companies at any time on payment of an indemnity equal to the average yield of the five best years during a period of seven years prior to the time of purchase.

The five private companies' freedom of administration has only been limited, up to the present time, by the terms of their concessions and the powers reposed in the Minister of Public Works, the latter being fixed by law and founded on the right of the government to regulate railway traffic in the interests of public safety. The companies have been allowed to fix rates, within the limits of fixed maximums, subject to the approval of the Minister.

As regards finance, each of the five companies had its own budget. In accordance with the existing agreement, the government guaranteed in case of a deficit the interest and principal of their capital, both bonds and shares, and the payment to the share capital of a minimum dividend. These amounts, which were advanced by the government in the form of a loan, paid 4 per cent interest and were to be repaid out of future profits first of all, then out of the sums payable for the recovery of equipment when the concession should come to an end, or in case of repurchase. When the profits reached a certain limit the government received a share. The revenue between the guaranteed minimum and the dividend which gave the government a right to a share was reserved to the stockholders.

In the case of three of these companies this government guaranty was only temporary—and for two of them, the Nord and the Paris, Lyons & Mediterranean, it had expired on December 31, 1914,—just the time, in fact, when it was most required. The guaranty in the case of the Est was due to expire in 1934. For the other companies (Orleans and Midi), it held good until their concession should come to an end.

To enable the Nord and the P. L. M. to carry on during the war an act was passed authorizing the companies to charge the deficiencies previously guaranteed to the original account—in other words to have recourse to a loan to meet their liabilities.

In 1914 one company, the Nord, had never applied for the government guaranty. Two other companies, the P. L. M. and the Est, had repaid their debts and the former had even been in a position to share its profits with the government. The debt of the two other companies was about 615 million francs ($123,000,000 at par exchange).

The Weak and Strong Roads

The organization, both administrative and financial, of the State railway is entirely different. It is under the direct authority of the Minister of Public Works and has at its head a manager appointed by the Minister, who is assisted by a Railway Board (Conseil de Reseau), which is merely a consulting body. The budget of this railway is attached, as a supplementary budget, to the ordinary government budget. Parliament approves the accounts and votes the credits. The public treasury has to meet the deficits and would have benefited from the profits if there had been any, but as a matter of fact this railway has always had a large deficit.

The various railways are very differently situated. They

all have a large agricultural traffic, for the reason that agriculture is well developed in every district of France, but while the Nord, the Est and the P. L. M. had also, before the war, a large industrial traffic, the Orleans, the Midi and the State were at a great disadvantage in this respect. This explains why the returns for these lines were so much lower than the returns for the first three. The figures of the gross and net returns show this clearly. For 1913 they are as follows:

Railway	Gross income per mile	Net income per mile
P. L. M.	$19,823	$8,528
State	11,467	1,628
Paris-Orleans	12,805	5,220
Est	19,767	7,607
Midi	11,936	5,288
Nord	28,187	10,908

At the beginning of the war, the financial position of the French railways, was as follows: In 1913 three companies had shown a surplus—the P. L. M., $1,600,000 and the Est and Nord about $1,400,000 each. Two companies had a deficit—the Paris-Orleans $3,400,000 and the Midi about $200,000. The State railway alone showed a defict of $13,400,000.

Inferior Management of State Railway

The management of the State railway has always been much inferior to that of the other companies. When in 1913 the operating ratio of the companies rose from 55 per cent to 61 per cent, that of the State railway reached 85 per cent. Although the traffic conditions of the Orleans railway and the State railway were very similar, the first, as we have seen, obtained a net yield per mile of $5,220 and the second $1,628 only.

Conditions During and After the War

With the declaration of war all the railways of France, in accordance with the law, passed into the control of the Minister of Public Works, who operated them as a single railway without altering their financial system, except as mentioned in the case of the Nord and P. L. M. When the railways were returned to their owners in 1919 prevailing conditions did not permit of reverting to the pre-war organization and a temporary system was established until a new scheme could be devised.

The management was restored to the railways but part of the war organization was retained, inasmuch as liaison committees were formed with the object of adjusting the traffic conditions on the different lines.

The railways also suffered financially from the after effects of the war. The restriction of commercial traffic and the continued rise of prices diminished the receipts and greatly increased the operating expenses. This resulted in a deficit which two successive increases of rates (70 to 80 per cent for passenger, 140 per cent for freight) were unable to cover. At the end of the year 1920, the deficit on the whole of the principal French lines since 1914 had risen to $1,114,600,000. It attained $1,327,000,000 if the bonuses granted by the government to employees on account of increased cost of living are taken into account.

The Problem

In 1918 the government entered into negotiations with the companies with a view to deciding upon the basis of a reorganization. The problem was a double one. It was necessary on the one hand to remedy the situation created by the war and on the other hand to establish a new organization for the future. Owing to the conciliatory spirit shown on both sides during these negotiations, they were successful and on May 18, 1920, the government submitted for parliamentary approval the agreement that the Minister of Public Works had drawn up with the approval of the companies.

After minute investigation and long debates in the Chamber of Deputies and the Senate, this agreement has just received the approval of both houses, after being subjected to numerous modifications in detail.

The following are the principal provisions of the new railway law:

Payment of Past Deficits

The provisions of the agreement are as follows: Owing to the fact that during the war the railways were to some extent managed as state railways the agreement provides that the government shall be responsible for the deficits of the companies since the beginning of the war up to January 11, 1921. Therefore the amounts paid by the government to the companies as guaranties of interest will not be repayable. As regards the Nord and P. L. M. whose guaranty of interest came to an end in 1914 and who were authorized to have recourse to a loan to cover their deficits, the government will ensure to them repayment of the sums thus borrowed by payment of annuities.

Moreover, the guaranteed debt in the case of the two railways which still had one was stopped on December 31, 1913, and ceased to bear interest on that date. It cannot be demanded until the end of the concession or in case of repurchase by the government.

Apart from this, the companies renounce all claims on the government both as regards losses caused by the war and events previous to the war. The government acts for them in regard to all reparations from the enemy.

The Reorganization of the Railways

Two principles were kept in view in drawing up the new scheme:—First, the maintenance of the existing companies, and second, the assurance that they should work in unison, and that there should be a closer association between the railways and the main interests of the nation; also, as a result the attainment of their financial solidarity subject to the rule that their receipts should balance their expenses.

The companies have strictly speaking, been maintained without any alteration in their statures, their internation organization, the powers of the boards of directors or their relations with their shareholders and employees. But new organizations have been formed, which are placed above them. These are the Higher Railway Council (Conseil Supérieur des Chemin de Fer) and the Executive Committee.

The Higher Railway Council

The Higher Railway Council, which is a consulting body, was formed with the object of ensuring better co-operation between the management of the railways and the general interests of the country. Its duty is to give advice and to keep the public bodies and the managements of the railways informed regarding the requirements of the users of the railways. But this Council has no real powers beyond those that the ministry delegates to it. The Ministry of Public Works retains all the powers which it previously possessed, with two additions. It obtains the right to reduce the rates when they seem contrary to the public interest, and also, in case of refusal or unwillingness on the part of the companies, it can officially carry out the measures which it already had the right of enacting.

It will have to consider all questions of a general character referring to the constitution of the railways, the method of running them, the plant, supplementary works, electrification, rates, etc. The Minister of Public Works cannot make any decision in these matters without being obliged to lay the matter before the Higher Railway Council, and if he does not wish to accept its opinion he must first call a second meeting of the latter.

The Higher Railway Council will include, besides the chairman, 60 members as follows: Eighteen members of the railway executive committee, 12 representatives of the employees (these representatives will be elected by the staff

itself, two for each railway, one to represent the higher grade employees and the other the lower grade employees), 30 representatives of the general interests of the country, nominated by the Minister.

The Executive Committee

The purpose and powers of the Executive Committee are entirely different. Whmile the Higher Council, by reason of the powers assigned to it, includes, besides the representative of the railways, representatives of the employees and the shipping public, the Executive Committee includes representatives of the railways only.

It is composed of 18 members, namely:—For each company, two directors and the manager, and for the state railways, the president and vice-president of the board of directors and the manager. It will be noticed that it does not include any representatives of the employees. A request was made that they should be included, but the companies did not give their consent to the proposal, as this committee has to make decisions which are binding on the railways, and must not, therefore, include members having no responsibility.

Whereas the duty of the Higher Council is to define the main lines of railway policy, and fix the general rules, the Executive Committee is the managing body of the railways in everything which affects their mutual interests. It was formed to propose and make all resolutions regarding questions which affect the railways as a whole, to put into force the decisions of the Minister of Public Works and the Higher Railway Council and apply them on all the railways.

Labor Provisions

With the object of putting an end to the disputes between the companies and their employees on questions of wages, pensions and working conditions a tribunal for arbitration purposes has been provided for. Half of this body will be composed of the representatives on the Higher Council of the railway or railways affected, and half of the representatives of the employees of the Council presided over by an arbitrator appointed by the members of the Council representing the public.

Finally we would mention that the agreement makes provision for the eventual incorporation of the Alsace-Lorraine railways into the organization. Judging from recent statements made by the government, this incorporation will shortly take place.

Financial Organization

The financial co-ordination of the railways leads, as a natural consequence, to their financial solidarity. Under the old system each railway had its own budget and accounts. In 1913 the statements of the railways showed a favorable balance for three of them and a deficit in the case of the other three. It happened thus that the first were able to distribute higher dividends to their shareholders, whereas the deficiencies of the second were a burden on the government, either directly as in the case of the State railway, or indirectly by reason of the guaranty of interest.

The principle of financial solidarity inscribed in the new convention consists, on the contrary, of making the railways as a whole bear the expenses of running them all. From the moment that it was decided to run the various railways as a single railway and the Executive Committee obtained the right to make decisions binding on all the railways, it became necessary for each one of them to feel that they were guaranteed against any injurious consequence of these decisions. Without this guaranty the railways would probably never have consented to accept the new administrative organization nor to bear the expenses of working in unison with the State railway.

Financial solidarity is achieved by the creation of common funds in which the profits of each railway will be placed, and from which the railways having a deficit will draw in order to make up their deficiencies.

Each railway will draw on its receipts according to its expenses and its financial burdens (interest and dividend payments and retirement of indebtedness). The surplus remaining will be paid into the common fund.

The Government's Responsibility

Rates must be so fixed as to bring the receipts up to the level of the expenses—subject to parliamentary approval. Every five years Parliament will revise the maximum rates on the advice of the Higher Railway Council. The agreement expressly states that this cannot be done, however, without taking into account the economic situation. It was, therefore, necessary to devise other means of making the common funds balance, and they are as follows: either the treasury will advance directly to the common fund the amount which is lacking, which amount must be repaid from the fund within the space of two years, or else the government will have to fall back upon the credit of the companies, which will each issue on behalf of the government bonds for the amount necessary to cover their deficiencies. Parliament will determine every year the maximum advances which the treasury can make to the common fund and the maximum bonds which can be issued by each railway.

These measures, which are of course temporary, are specially intended to be applied during the first few years when the financial position of the railways will probably still be difficult. When normal conditions arrive, the adjustment of the rates will, very likely, be sufficient to enable the railways to balance their accounts.

When the common fund shows a surplus, this surplus will be applied in the first place to repaying any advances which may have been made to it. They will then be used to form a reserve fund, the maximum amount of which will be fixed by the Minister of Public Works. The surplus, if there is one, will go to the government. In this event the Minister can lower the rates so as to make the receipts and expenditures balance again.

The dividend on the shares of the companies is guaranteed at the minimum fixed by the former agreements, namely, 54 francs for the Nord, 35.50 francs for the Est, 55 francs for the P. L. M., 50 francs for the Midi and 56 francs for the P. O. A nominal dividend has been fixed for the State railway which will be collected by the treasury.

As has been shown, this dividend does not rise or fall on account of the constitution of the common fund, except by means of the management premium.

The Management Premium

The management of its railways by the companies would have been apt to become entirely disinterested if the amount of the dividend has been uninfluenced by operating results. It was necessary, therefore, to find some means of interesting the companies in the efficient running of the railways. The agreement attains this end by creating a management premium.

It was difficult to find a formula, and the bill was altered several times when it was being drawn up and in its passage through Parliament. To form a basis for the calculation, it was necessary to define as exactly as possible the factors which were supposed to show most definitely the results of good or bad management. Then each of these factors had to be given a relative value, according to existing circumstances.

The two factors decided upon are the following:—Development of traffic and economy in operation.

In view of the present financial situation of the railways, which had a deficit, as shown in the 1920 statement of accounts, of no less than $500,000,000, more weight was at-

tached to the second factor with the object of encouraging economical management on the railways.

Working on these principles, the management premium is calculated as follows. It has two distinct factors:

(A) Three per cent of any surplus receipts shown in the statement of accounts, with reference to the receipts in the 1920 statement of accounts, which will be taken as a basis. In making this calculation, the receipts resulting from the two increases of rates which came into force during the last few years will not be taken into account. This last condition is made with the object of inducing the railway companies to develop their traffic, which is measured by the bare receipts, and not by increases of rates which would swell the total receipts independently of any increase of traffic.

(B) One per cent of any decrease, with reference to the 1920 statement of accounts, in the deficiency of the receipts as compared with the expenses, and further, when the receipts exceed the expenses, one per cent of the total excess. On the other hand, if the statement of accounts shows an increased deficit compared with the 1920 statement, a penalty of two per cent of such increase will be exacted.

Taking into account the fact that the results for 1920 were adversely affected by the price of coal, the decrease in which is already making itself felt, and that the fact of this decrease in price alone will show better results without much credit being due to the companies, the agreement has made certain alterations in the 1920 results. According to expectations the premium will vary round about $1 per share and may increase later to some extent as regards the first statements of accounts.

Employees' Premium

It was desired to interest the employees also in the efficient running of the railways and the agreement provides that they shall receive a premium in the same way as the companies. It will be calculated according to the formula which we have just quoted. The factors will, however, be doubled until the total attains a maximum per railway of 1.50 per cent of the receipts forming the basis of the first factor, namely, the bare receipts.

The premium will be divided among the employees in accordance with the rules which the State Council draws up for the application of the act. At first each employee will receive a share of the premium amounting to about $20.

New Capital Bonds

The new agreement has altered the system with regard to bonds issued by the companies. Formerly they were obliged to redeem all bonds before they were due. This responsibility became heavier as the date of redemption drew near and even before the war there had been some idea of altering the agreements in this respect. The new convention has decided that the bonds issued under the new system will be redeemable in 60 years and that, when they fall due, the government will be responsible for bonds which are not yet redeemed. This is one of the most interesting financial arrangements made by the new convention.

Repurchase

Finally, the agreement modifies the terms on which the concessions will eventually be repurchased. We have seen that the government reserved to itself the right of repurchasing the concessions at any time on the following terms:

Payment of an annuity based on the net yield of the last few years, and an indemnity equal to the replacement value of the rolling stock and stores.

The method of arriving at the value of rolling stock has been changed under the agreement. Henceforth value is to be considered original cost less depreciation at 2.5 per cent for each year of service. The stores will be paid for at cost price.

The agreement provides further that when two of the existing companies have turned over their properties to the government on account of the normal expiration of their concession the other companies can also claim their repurchase. The companies could not consent to remain in a combination in which the government would be in the majority.

President Believes Railroads Recuperating

WASHINGTON, D. C.

THE PRESIDENT believes that the railroad situation is now very greatly improved, it was said at the White House on December 27, in response to a question as to the prospects for improved business conditions for 1922 as shown by the reports of government departments. In spite of the failure of the railroad securities bill in the Senate, it was stated that the administration has been able to so handle its railroad securities as to be able to carry out settlements with the railroads and to fund such of the indebtedness of the roads for capital improvements as it desired without asking Congress for any money, and that with the funds available it will be possible to meet the funding situation so as to cover all necessities without asking for additional authority or additional funds. The President looks for a marked recuperation of the railroad condition and is confident that that is likely to result in a recuperation of business generally.

The statement regarding the settlements refers to the fact that the cash resources of the Railroad Administration have been increased by the sale of equipment trust certificates. This has not placed at the disposal of the administration funds enough to do as much funding as was contemplated when the bill to authorize the War Finance Corporation to take over some of the railroad securities up to $500,000,000 was proposed, but it is understood that many of the railroads are now in a better position to make settlements without funding or by funding less of their indebtedness than they were last summer. The plan as proposed then was to give the railroads additional cash with which to carry out maintenance work and place money in circulation in the hope that it would improve business conditions.

PAYMENT OF EMPLOYEES by check instead of in cash is to be the rule henceforth on the New York, Ontario & Western. Hitherto the pay car has made regular trips over the road twice a month.

Photo by Keystone

Railway Station, Leipzig, Germany

Ferry Cradle at St. Louis Embodies New Features

Missouri Pacific Builds Barge Transfer for Heavy Loads and Wide Range in River Level

By F. E. Bates
Assistant Bridge Engineer, Missouri Pacific

UNLIKE the other roads which operate lines across the Mississippi river at St. Louis, the Missouri Pacific handles a large part of its traffic by means of a car ferry. As shown on the track diagram (Fig. 1) of the St. Louis terminals of that road, the freight traffic of the Missiuri Pacific between St. Louis and points in Arkansas and Louisiana, which is handled on the east side of the Mississippi river to Dupo, may enter and leave St. Louis by way of the ferry transfer without the use of other than Missouri

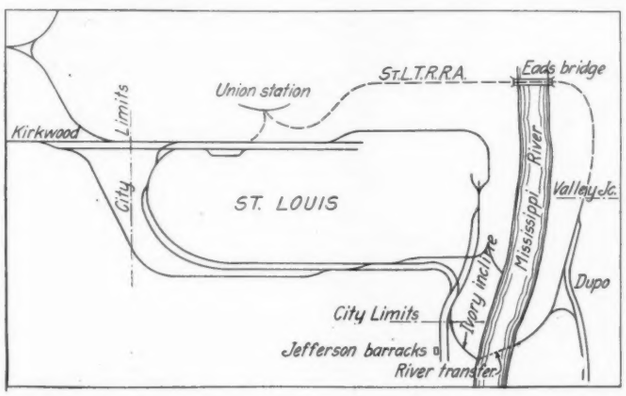


Fig. 1—Sketch Showing St. Louis Terminals of the Missouri Pacific

Pacific rails. The traffic handled in this manner amounts to as much as 600 cars a day, including a considerable number of hopper-bottom coal cars of 55 to 70 tons capacity. The marine equipment consists of a four-track 26-car steel barge operated by a stern wheel tow boat.

Owing to the wide variation in the stage of water in the Mississippi river, one troublesome detail in the handling of the ferry traffic concerns the method provided for transferring the cars from the tracks on the river bank to the ferry. This is commonly accomplished with the aid of a cradle consisting of an inclined trestle mounted on wheels that roll on an inclined track laid on the grade of the river bank.

When the Missouri Pacific cradles were renewed in 1920 and 1921, the increase in car loading and power required to handle traffic on the incline grades of from 2.5 to 4 per cent made it necessary to use heavier construction throughout and to provide additional rigidity against the heavy traction and shocks of the barge landing against the cradles. Accordingly, Coopers E-55 was used for live loading to provide for an 0-6-0 switch engine with 65,000 lb. on each pair of drivers, the axles being spaced 6 ft. 6 in. center to center. Both cradles are of similar construction and the description will be confined to the west cradle at West Ivory.

The profile in Fig. 3 shows the grades on the cradle and the incline. The incline tracks are carried on a timber trestle with panels 10 to 12 ft. center to center and three ply 8-in. by 16-in. chords. The design and spacing of cradle supports were made to reduce the stresses in the incline trestle as much as possible. The main portion of the cradle is of timber construction with 24-ft. cast steel feather rails at the shore end and a 38-ft. hinged steel apron girder at the river end.

The details of the timber portion of the cradle are shown in Fig. 2. Special attention was given to the reduction of the unit bearing stresses as considerable trouble was experienced in the previous cradle with bearing failures. Caps and sills 16 in. wide were used throughout. Wheels were spaced 7 ft. center to center except at the low end where special construction was required. All wheels are standard solid cast wheels mounted on 5½ in. by 10 in. car axles. The cradle tracks are carried on two-ply 8-in. by 16-in. stringers and sawed oak cross ties with tie plates. Oak ties were used in place of pine on account of occasional derailments, and 4-in. blocks are provided for separators to supplement the notching of the outside guard timber. No drift bolts or dowels were used in assembling the cradle. Threaded bolts were used throughout and these were placed to permit replacing any timber members without disturbing the structure as a whole. In order to provide a certain amount of flexibility in the higher portion of the cradle to accommodate the slight changes in grade of the incline track, the 12-in. by 14-in. wheel timbers were cut and pinned together and the longitudinal bracing omitted in each second panel.

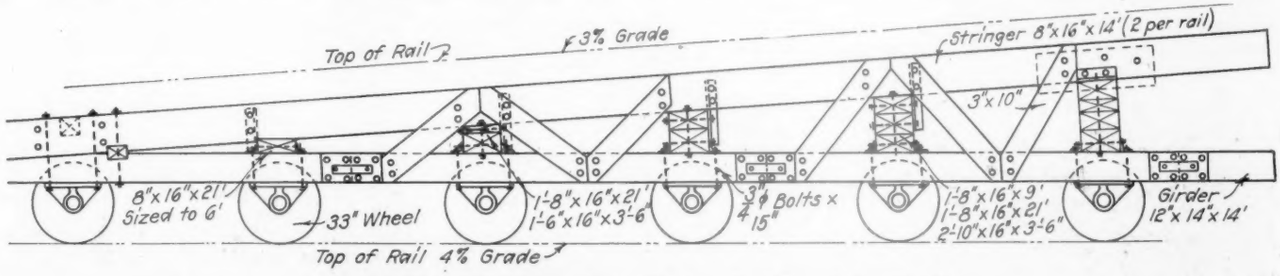


Fig. 2—Part Elevation of the Timber Portion of the Cradle

Fig. 3 also shows the special construction of apron girders and supports. To increase the car capacity of the outside or wing tracks on the barge the turnout is placed on the cradle with the frog point at the river end of the apron girders. Additional wing girders are required to support the turnouts. The rear ends of the apron girders are hinged to a heavy steel shoe supported on a six-wheel truck to distribute the loads on the incline. The pin acts only as a guide as the hole is made ⅛ in. large, and all vertical loads are carried by the rocker bearing. The pin is placed as high as possible to

reduce the gap in the rails for variations of tilt of the apron girders.

The difference between light and loaded draft of the barge is four feet and during loading and unloading the barge has a maximum list of approximately two feet. To provide for these variations and an allowance for inaccuracy of spotting the cradle, provision is made for a maximum vertical travel of the river end of the apron girders of five feet. The barge is guided to the cradle by cluster piles on the bank side and as it is very hard to maintain these clusters at the proper location provision was made for a lateral movement of two feet in either direction. Lateral movement is provided for by front of the barge serve as guides to line the cradle and barge accurately.

The counterweight towers are carried on two steel trucks and the load is equalized on the four rails by the use of larger shims under the carrying beams over the inside wheels than over the outside wheels. The connection at the bottom of the towers was made on a slight bevel so that the towers will stand vertical when the carrying beam is deflected under load. The barge, when landed against the cradle, supports the river end of the cradle beams and relieves the counterweights and jacks of all live load.

The adjustment of the cradle to proper elevation is made

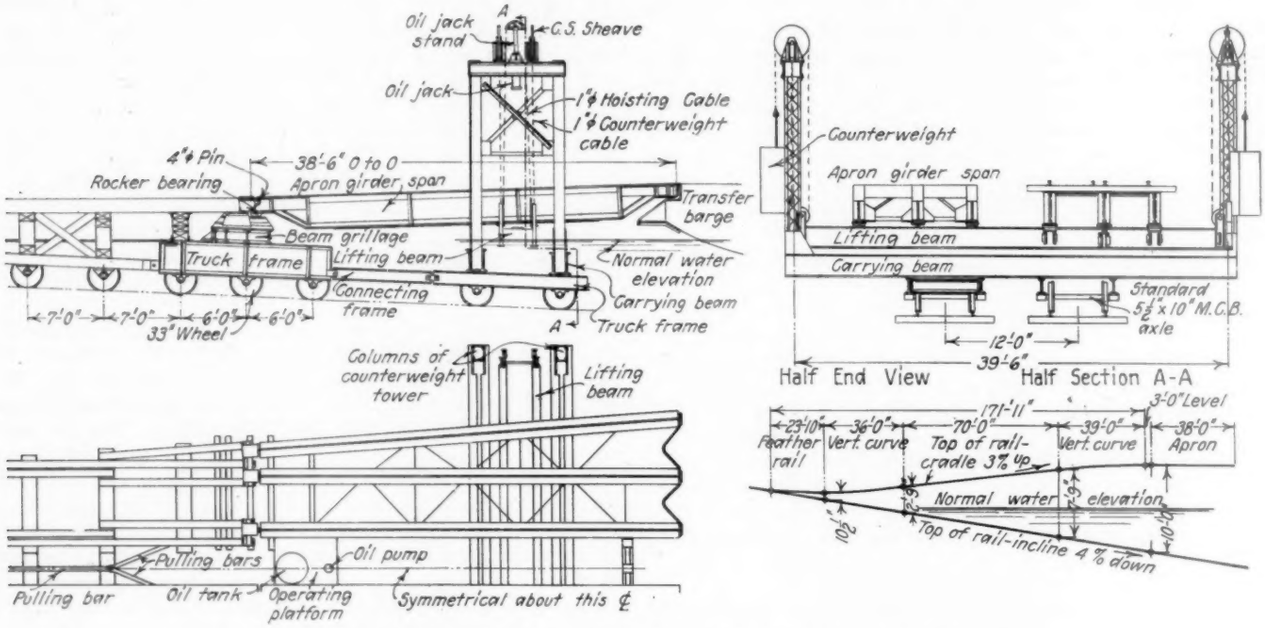


Fig. 3—Half Plan, Elevation and Section of the Apron and Its Supports

slotting the pin holes at the shore end in the outside girders of each set.

The apron girders are partially counterweighted from two towers as shown in Fig. 1. They are adjusted by means of one hydraulic oil jack at the top of each tower operated by a small hand force pump. By manipulating the two jacks separately it is possible for the operator to tilt the girders as necessary to line up with barge as it comes in. The "Vs" between the rails on the cradle and corresponding ones at the by pulling or pushing the cradle up or down the incline. The steel truck frame under the apron girders is provided with heavy lateral bracing, and pulling bars, consisting of old bridge eye bars. These are connected to the two inside girders and are carried to the shore end of the cradle, where double and treble blocks and 1¼ in. steel cable are provided with anchorage to dead men for pulling the cradle up the incline. The power is furnished by switch engines. The cradles are pushed down the incline with a push pole.

Rock Island Yard and Shop, Silvis, Ill.

Annual Report of the Bureau of Finance I. C. C.

Enormous Variety of Detail Dealt with by New Bureau; Seven Hundred Miles of Road Abandoned

WASHINGTON, D. C.

THE ANNUAL REPORT of the Interstate Commerce Commission, noticed in our issue of December 10, page 1157, includes the reports of the three new bureaus created by the commission in 1920 in connection with the expansion of its organization which was necessitated by the new functions conferred upon it by the provisions of the transportation act. These are the Bureau of Finance, of which W. A. Colston is director; the Bureau of Traffic, of which W. V. Hardie is director, and the Bureau of Service, F. G. Robbins, director. While these bureaus were organized last year, the report for this year is the first to cover a full year of their activities. The commission's report also includes the usual reports of the work of the older bureaus, which follows the same lines as in previous years.

The work of the Bureau of Finance represents the most distinctively new phase of the commission's increased authority under the new law. The report deals with the work under the provisions of the transportation act relating to the issuance of certificates of public convenience and necessity, applications for authority for the acquisition of control or for the consolidation of carriers, the regulation of security issues, the six-months guaranty following the termination of federal control, the administration of the $300,000,000 loan fund and similar matters. It refers to several points on which important questions as to the interpretation of the act have arisen and suggests modifications. An abstract of the report of this bureau is given herewith; and the others will be noticed as available space is found.

Certificates of Public Convenience and Necessity

During the year ended October 31, 1921, 79 applications for certificates of public convenience and necessity were filed. Fifty-one certificates have been issued, and 10 applications have been withdrawn. Of the total applications filed, 39 were for permission to construct new lines of railroad or to extend existing lines, and 40 were for permission to abandon lines of road. The authorization issued during the year covered about 405 miles of new construction and 702 miles of abandonment.

Pursuant to the provisions of section 13 of the act, we have availed ourselves of the co-operation, services, records, and facilities of the state commissions in disposing of applications for certificates. At our request these commissions have held hearings in 15 such cases, transmitting to us the records thereof together with their recommendations, which, in 13 of the cases, were followed by us.

During the year questions have arisen respecting the proper construction of paragraphs (18) to (22), inclusive, of section 1 as affecting our jurisdiction thereunder.

The question has also arisen whether the provisions in paragraphs (4) to (8) inclusive of section 5 as to consolidation of the railway properties into a limited number of systems are intended to prevent the voluntary consolidation of two or more of such carriers pending ultimate adoption by us of a complete plan of consolidation, as provided in paragraph (5), or whether in the meantime they may effect such voluntary consolidation, either with or without our approval.

The statute does not expressly provide for such consolidations during the interval which must elapse before adoption by us of the complete plan. An interpretation of these provisions which would prohibit all consolidation in the meantime might work hardship and fail to meet the underlying intent of the Congress. It seems desirable that the uncertainty should be resolved by appropriate amendment.

In six cases in which we have authorized the construction of new lines of railroad, permission has been granted under paragraph (18) of section 15a to retain the excess earnings derived from the operation of such new lines.

The cases in which certificates of public convenience and necessity were issued during the year are shown in the double-column table.

CONSTRUCTION

Name of applicant	Location of line	Mileage
Ahukini Terminal & Railway	District of Puna, Kauai, Hawaii	16
Alabama, Florida & Gulf	Houston County, Ala.; Jackson County, Fla	13
Buffalo, Rochester & Pittsburgh	Indiana County, Pa	1.97
Central of Georgia	Jefferson County, Ala	6.78
Central of New Jersey	Cumberland County, N. J	1
Detroit & Ironton	Wayne County, Mich	15
Flint Belt	Genesee County, Mich	8.25
Idaho Central	Twin Falls County, Idaho; Elko County, Nev	90
Interstate	Wise and Scott counties, Va	25
Jackson & Eastern	Scott, Leake, Rankin, and Hinds counties, Miss	61
Kentucky & Tennessee	McCreary County, Ky	1.73
Oklahoma & Arkansas	Delaware and Mayes counties, Okla	20
Pittsburgh & West Virginia	Brooke County, W. Va.; Washington County, Pa.	3.2
Potato Creek	Potter and McKean counties, Pa	2.22
Tennessee	Campbell and Anderson counties, Tenn	6
Texas Midland	Hunt County, Tex	14
Uintah	Uintah County, Utah	24.965
Union Pacific	Scotts Bluff County, Nebr.; Goshen County, Wyo.	43.4
Wichita Falls & Southern	Stephens and Young counties, Tex	44
Wisconsin & Michigan	Dickinson County, Mich	7.17
Total miles of construction		404.705

ABANDONMENT

Atchison, Topeka & Santa Fe	Yavapai County, Ariz	5.9
Atchison, Topeka & Santa Fe	San Bernardino County, Calif	15.18
Atchison, Topeka & Santa Fe	Kay County, Okla	4.67
Bennettsville & Cheraw	Marlboro, Dillon and Marion counties, S. C	10.44
E. R. Bernstein, receiver of Louisiana & Northwest	Natchitcches Parish, La	22
Boston & Maine	Coos County, N. H	3.39
Boston & Maine	Grafton County, N. H	9.47
Central New England	Hampden County, Mass	1.87
Delta Southern	Washington, Bolivar, Sharkey, Leflore, and Humphreys counties, Miss	52.11
Duluth & Northern Minnesota	St. Louis, Lake and Cook counties, Minn	99.2
Eastern Texas	Angelina, Trinity, and Houston counties, Tex	30.3
Gulf, Mobile & Northern	Jones County, Miss	6.6
Kentwood, Greensburg & Southwestern	Tangipahoa and St. Helena Parishes, La	13.21
Kinder & Northwestern	Allen Parish, La	14
Liberty-White	Pike and Amite counties, Miss	24.2
Mississippi Central	Ferrest County, Miss	11.74
Northern Pacific	Richland County, N. Dakota	1.87
Ocean Shore	San Francisco, San Mateo, and Santa Cruz counties, Cal	53.628
Orangeburg	Orangeburg County, S. C	17.7
Patterson & Western	Stanislaus County, Calif	23.6
R. B. Pegram, receiver of Hawkinsville & Florida Southern	Pulaski, Wilcox, Turner, Worth, and Mitchell counties, Ga	92.97
Pere Marquette	Kalkaska County, Mich	11.47
Pere Marquette	Benzie County, Mich	4.45
Pere Marquette	Clare County, Mich	9.88
Potato Creek	Potter and McKean counties, Pa	13.49
Seaboard Air Line	Nassau County, Fla	1.39
Seaboard Air Line	Manatee County, Fla	.66
Spokane & British Columbia	Ferry County, Wash	36.30
Sugar Pine	Tuolumne County, Calif	14.15
R. V. Taylor, receiver of the Alabama & Mississippi	Washington County, Ala.; Green, George, and Jackson counties, Miss	77.75
Wisconsin-Northwestern	Marinette County, Wis	18.3
Total miles abandoned		701.938

Acquisition of Control and the Consolidation of Carriers

Under the provisions of paragraph (2) of section 5 of the amended interstate commerce act we are authorized to approve, by order, the acquisition by one carrier of control of one or more other carriers, whether by lease, or by purchase of stock, or in any other manner not involving the consolidation of such carriers into a single system. During the year, 25 applications have been filed under this paragraph and 19 orders have been issued, in each case granting the authority requested.

Three applications were filed for authority to effect consolidation, but in each case the applicant was advised that its application could not be considered in advance of the adoption of a complete plan of consolidation as required by paragraphs (4) and (5) of section 5.

Recovery of Excess Net Railway Operating Income

Under the provisions of paragraphs (5) to (16) inclusive, of section 15a of the act, we are required to recover one-half of the annual net railway operating income received by any carrier for any year in excess of 6 per cent of the value of the railway property held for and used

by it in the service of transportation, Forms of questionnaire and return, together with rules and regulations for the determination and recovery of excess income under this section, are in preparation.

Issuance of Securities —Assumption of Obligations

Since our last annual report 283 applications under section 20a have been received, and the issue of securities in the following aggregate amounts, largely for refunding purposes, has been authorized:

Stocks	$242,657,500
Bonds	1,276,761,616
Notes	98,402,195
Miscellaneous	97,780,313
Total	1,715,601,624

Under the provisions of paragraph (9) of section 20a, certificates of notification of the issuance of notes maturing within two years or less in the aggregate sum of $137,502,723 were filed.

Some difficulty has arisen in the construction of section 20a in its application to electric lines. Under the law as it now stands, we have no jurisdiction over the issuance of securities of a "street, suburban, or interurban electric railway which is not operated as a part of a general steam railroad system of transportation." Certain electric railways independently operated are engaged in the general transportation of freight in interstate commerce in addition to the transportation of passengers. Some electric lines correspond substantially to steam roads in all important particulars except that of motive power. Under section 15a of the act we are given authority to include in groups of carriers for ratemaking purposes such interurban electric lines as are engaged in the general transportation of freight. It seems desirable that section 20a of the interstate commerce act be so amended as to indicate definitely the classes of electric railway companies subject to that section.

Three applications requesting authority to issue shares of capital stock without nominal or par value have been filed with us. One of them, filed by the El Paso & Southwestern Company, involved the exchange of stock without par value for stock having a par value; authority upon this application was granted. The other two applications involved the issue of stock without par value under reorganization plans for railroads previously in receivership. Authority upon one of these, filed by the Denver & Rio Grande Western Railroad Company, was granted. The other is pending.

Reimbursement of Deficits During Federal Control

In the administration of section 204 of the transportation act, 1920, we have encountered some difference of opinion as to the proper interpretation of the term "deficit" as used in the statute. Paragraph (a) provides that "when used in this section, the term 'carrier' means a carrier by railroad which, during any part of the period of federal control, engaged as a common carrier in general transportation, and competed for traffic, or connected, with a railroad under federal control, and which sustained a deficit in its railway operating income for that portion (as a whole) of the period of federal control during which it operated its own railroad or system of transportation," etc. Paragraph (b) provides that "for the purposes of this section, railway operating income or any deficit therein for the period of federal control shall be computed in a manner similar to that provided in section 209 with respect to such income or deficit for the guaranty period," etc. We have construed this language to limit the application of section 204 to carriers which, in the portion of the period of federal control (as a whole) during which they operated their own lines of railway, sustained actual deficits in railway operating income without reference to the results for any other period, and to limit the extent to which such deficits may be reimbursed to the amounts remaining after the adjustments specified in paragraphs (1) to (5) of subdivision (f) of section 209.

Of 279 claims for reimbursement of deficits filed with us, no less than 93 fall without this construction of the law in that no actual deficits were sustained in the portion of the period of federal control during which the respective carriers operated their own lines. Protests against our interpretation of the statute have been lodged by a considerable number of carriers thus excluded from the benefits of the section, who contend that the word "deficit" as used in section 204 means a decrease or falling off in railway operating income for the federal control period, as compared with that of the test period.

The claims of the carriers which are entitled to reimbursements of deficit, under our construction of that word, aggregate $14,128,455. Owing to necessary corrections and adjustments, it is estimated that the amount to be certified in respect of these claims will be $11,079,800. Partial payments under section 212 of the transportation act, added February 26, 1921, and final settlements thus far certified, with the estimated amount remaining to be certified, are summarized in the following table, where the amounts payable under paragraphs (f) and (g) of section 204, deductions therefrom on account of traffic balances and other indebtedness due the President, as operator of transportation systems under federal control, and the net amounts actually payable to these carriers are set out in the order mentioned:

Status	Amounts payable under paragraphs (f) and (g)	Deductions	Net payments
Certified:			
Final settlements (20 carriers)*	$992,529	$230,880	$761,650
Partial payments	2,177,651	820,345	1,357,305
	3,170,180	1,051,225	2,118,955
Remaining to be certified	*7,909,619	*3,203,062	*4,706,557
Total	*11,079,799	*4,254,287	*6,825,512

*Estimated.

Six Months' Guaranty

In our last report we stated that 666 carriers filed acceptances of the provisions of section 209 of the transportation act, 1920 on or before March 15, 1920, as prescribed by law. It has been ascertained that one other small carrier accepted the provisions of the act within the time specified and that the total number of carriers accepting is therefore 667. Of this number, 547 have filed returns, showing an aggregate amount of $818,400,185 as due them under the provisions of the act. Included in this number are the returns of 59 carriers not having a separate status under section 209, although filing separate acceptances. Of the corporations that have not filed returns it has been decided by us that 8 were not carriers as defined in section 209 and that 32 were operated as joint facilities and will not be entitled to any benefits under the provisions of section 209, their revenues and expenses being cleared through the accounts of the operating carriers. The remaining 80 carriers either had excess incomes or are short line carriers, the amount of whose claims will be relatively small.

The addition of section 212 to the transportation act, effective February 26, 1921, authorizes partial payments under section 209, and permits us, in case of deferred debits and credits to railway operating income which cannot at that time be definitely determined, to make a reasonable estimate thereof, and when agreed to by the carrier, to use such estimate in certifying the amount due in final settlement of the guaranty. Since that date, 447 requests for partial payments under subdivision (g) of section 209, as amended by section 212, have been filed by carriers. Returns to our orders of October 18, 1920, and January 5, 1921, after making certain adjustments, have been used as a basis in certifying partial payments, and on the basis of such returns we have certified approximately $166,000,000 for payment.

We estimate the total amount payable under the guaranty at about $536,000,000. Of this amount there have been certified to the carriers:

As advances under section 209(h)	$263,935,874
As partial payments under section 209(g) as amended by section 212	165,862,775
In final settlement under section 209(g)	721,658
Total	$430,520,307

Leaving an estimated amount still payable to the carriers under section 209 about $105,500,000.

Final settlements have been made with 5 carriers, as follows:

Name of carrier	Amount certified
Alabama & Mississippi	$16,543
Ann Arbor	75,261
Electric Short Line	14,993
Electric Short Line Terminal	3,158
Norfolk Southern	611,700

Loans to Carriers

Because of the general depression in business during the year and the resulting decline in the costs of materials and labor, some carriers, considering it sound business discretion to defer expenditures of the proceeds of loans certified to them, requested us to cancel our certificates and to consider their applications as withdrawn. Other carriers have requested us to authorize them to expend a portion of the proceeds of their loans for purposes other than those for which the loans were originally made. We have generally approved this policy and have thus been able to extend the benefits of the revolving fund to other carriers more urgently in need of financial help, particularly in respect of maturing indebtedness. Several changes are therefore necessary in the previous statement of loans made.

The amendment to section 210 effected by section 5 of the sundry civil appropriations act, approved June 5, 1920, authorized us to make loans for equipment to or through such organization, car trust or other agency as we might determine upon, approve or organize for the purpose "as most appropriate in the public interest," subject to the provisions of the act. The National Railway Service Corporation, a corporation of the state of Maryland, organized under the auspices of the National Association of Owners of Railroad Securities, has been approved by us as an agency for this purpose, and we have certified to this corporation the following loans for the benefit of carriers named:

Baltimore & Ohio	$5,200,000
New Orleans, Texas & Mexico	926,000
Bangor & Aroostook	53,106
Chicago, Rock Island & Pacific	1,568,540
Minneapolis & St. Louis	386,190
Wheeling & Lake Erie	3,304,000
Total	$11,437,830

As a condition of the certification of these loans the National Railway Service Corporation and the carriers themselves were required to finance from outside sources $18,409,765.

Paragraph (a) of section 210, as amended, limits the time within which applications for loans may be filed with us to two years from February 28, 1920. In prescribing this limitation the Congress apparently anticipated that the "transition period" would be of relatively short duration. The progress of readjustment throughout the country has been slower than was generally anticipated.

In addition to the uncertified balance of the revolving fund on October 1, 1921, not including $40,000,000 tentatively reserved to meet claims, judgments, etc., against the Railroad Administration arising out of federal control, repayments of principal of loans already made, which by their terms require early or serial repayment, and accretions to the fund from semi-annual interest payments during the 2 years following February 28, 1921, are estimated to aggregate $93,000,000, making an approximate total of $103,000,000 available for additional loans if the period for filing applications should be extended.

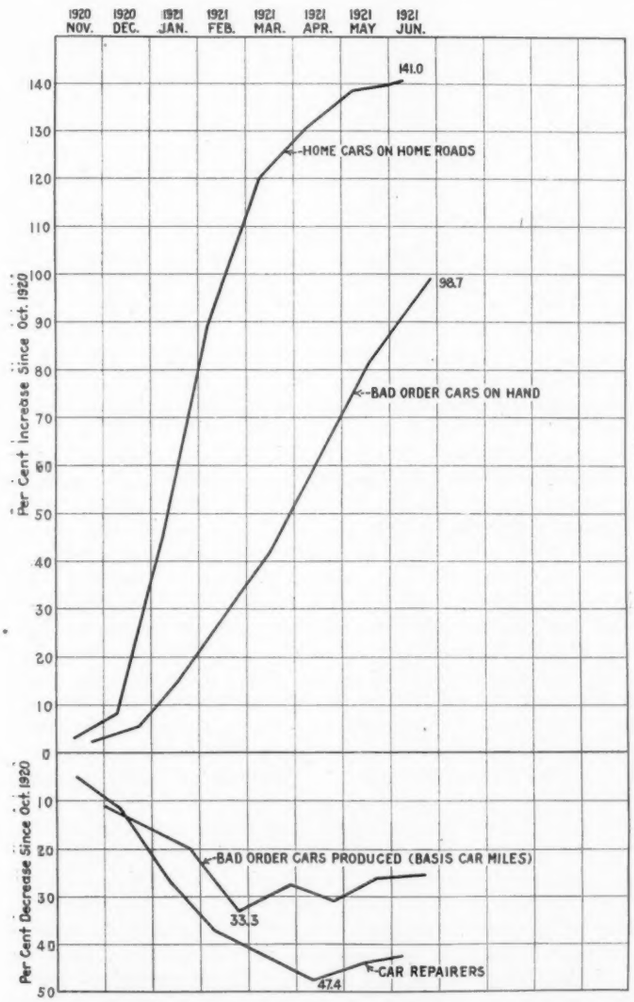
Does It Pay To Repair Foreign Freight Cars?*

Some Relations Between Freight Car Repairs, Transportation Expenses and the Income Account

By N. D. Ballantine
Superintendent Transportation, Union Pacific System

MASTER CAR BUILDER'S Rule No. 1 reads as follows: "Each railroad is responsible for the condition of all cars on its line, and must give to all equal care as to inspection and repairs, regardless of responsibility for expense of repairs." This rule, however, was not followed even under Federal control. In support of the conclusion that the same condition still exists, a brief consideration of the bad order situation may be worth our while.

We can doubtless agree that mass figures, involving a large number of items, probably reflect a situation more correctly



Percentage Variations in Car Conditions Since October, 1920

than similar data compiled by an individual carrier. Before proceeding further, however, it may be well to see if we can also agree that there has been no material change in the manner in which roads repair cars or report their bad order situation now, as compared with federal control practices.

*A paper read before the Western Railway Club, November 21, 1921.

Data deduced from some records kept while with the Car Service Division of the U. S. Railroad Administration covering the repairs given to freight cars during the years 1918 and 1919, indicates that with about forty-five billion freight car miles produced during the two years, there were about forty million repairs, heavy and light, given to freight cars. This means that each freight car moved an average of 811 loaded and empty miles before being switched to the repair track for repairs. The same factor obtained in each year. The figures also indicated that of the total cars bad ordered, 9.6 per cent were for heavy repairs in 1918, and 9.4 per cent in 1919, or approximately 10 per cent during the period.

Would it not seem reasonable to assume that unless there has been some fundamental change in the methods of making repairs or reporting bad orders, we could safely continue to use for the country as a whole, 811 miles as the average service which will create a bad order car?

In the table, the total freight car miles has been divided by 811 to obtain the column headed "Bad Order Cars Produced." With this exception, the figures shown are taken from statistics furnished by the Bureau of Railway Economics and Car Service Division of the A. R. A.

It will be agreed that we have no absolute basis with which to measure car repairer's efficiency, but during the period of comparison I believe it will generally be conceded that the output per car repairer increased materially.

FACTORS IN THE BAD ORDER CAR SITUATION OF CLASS I RAILWAYS OF THE UNITED STATES

Month, 1920	Home cars on home roads	Average bad order cars on hand	Bad order cars produced	Car repairers
October	731,699	177,655	2,657,471	95,068
November	749,774	181,595	2,397,046	91,188
December	790,933	189,490	2,275,218	84,123
1921				
January	1,074,661	209,667	2,118,640	70,307
February	1,396,048	234,506	1,772,067	60,319
March	1,612,185	260,230	1,923,808	54,537
April	1,689,225	296,233	1,836,170	50,051
May	1,744,907	329,850	1,969,360	52,919
June	1,764,612	351,465	1,980,122	54,410

From time to time we read in the newspapers and lately even in the *Railway Age* reference to the abnormally poor condition of the freight equipment of the country, conclusions generally being drawn, I infer, from a comparison of tabulations made by the Car Service Division as to the bad order cars on hand. The real situation as to condition of freight equipment should not be concealed nor, on the other hand, magnified. However, I feel that the figures for bad order cars on hand, taken alone, are prone to mislead as to the real condition, for the reason that during the period under consideration, a very unusual situation developed in connection with the return of cars to their owners. Had M.C.B. Rule 1 been generally observed in spirit or letter, the effect of relocation of cars to home lines would not have been accompanied by such a substantial increase of bad orders, but surely our mechanical friends who are at all familiar with actual conditions will agree that during the period referred to, and probably up to the present time, their practice was to card a large percentage of system cars "Bad Order," while a foreign car having, as nearly as could be determined, the same defects, but safe to run, was not so carded, but sent home—there to be carded. What really happened, then, is that while there was a substantial decrease in the factors producing bad orders,

car repairers were decreased somewhat in proportion, slightly more, but their efficiency increased, while bad orders reported mounted at an extremely rapid rate, following the trend of the rapid return of cars to owners.

The chart on the following page, which is self-explanatory, may help to visualize the relations existing, and would seem clearly to indicate that until such time as M.C.B. Rule 1 is generally observed, in proportion as home cars on home roads increase, the bad order reports will show an increasing number of bad orders, although there may be no real difference in the actual physical condition of car conditions as a whole.

Manifestly, M.C.B. Rule 1 will not be observed until such time as allowances for the repairs to foreign cars are equal at least to a sum sufficient to compensate a road for doing such work, including supervision, shop overhead, interest, depreciation, insurance and taxes covering the facilities used in making car repairs, together with the cost for switching and the per diem equivalent while cars are out of revenue service to be repaired. Owing to the widely varying conditions and ideas existing with respect to the cost of overhead and the other items above referred to and lack of sufficiently reliable data covering the matter, this phase of the subject will not be dwelt upon. These factors can only be determined through an actual and careful study of local conditions.

My object will be to point out a basis upon which a study could be made to include some important relations which exist, in order that a proper policy may be adopted, having in mind the best interests of a property as a whole, without regard to departmental lines.

Direct and Indirect Expense

Let us define direct expenses as all items affecting freight car repairs which can be, and generally are, charged directly to the particular job, and indirect expenses as all other items affecting freight car repairs which can properly be included in the overhead and other items already referred to and which cannot be directly charged.

Owing to the difficulty of determining the "indirect expense," and for want of a better basis from which to draw conclusions, I shall confine myself to some deductions or comparisons from the item, "direct expense."

The relation between the prices allowed under M.C.B. rules and the direct expense involved in doing that particular piece of work should represent the allowance for the indirect expense. For example, if labor costs 72 cents an hour and M.C.B. rules permit billing for labor at $1.20 an hour, then 66.6 per cent of the direct labor expense is to apply on the indirect expense. A comparison on the above basis, covering labor and various other items which go to make up the principal material used in car repairs might be of interest and value to any road.

Per Diem

While per diem does not directly affect any operating account nor a road's operating ratio, it does affect a road's net income through the "hire of equipment" account. Therefore time is an important element in the matter of repairs to foreign cars in its effect upon that portion of the M.C.B. allowance covering the indirect expense as the following illustration will show.

Assume that an average of $15 per day direct expense could be economically applied on a foreign car, and that it had been determined through the method above outlined that 33.3 per cent of its direct expense was available to apply on the indirect expense. Then $5 would represent the indirect portion. As seven days per diem would be paid covering six working days it would be equivalent to $1.17 per day and would absorb 23 per cent of the indirect allowance. If, however, it should take two days to spend such a sum, then 46 per cent of the indirect allowance would be absorbed by the per diem paid out while undergoing repairs. Therefore, in proportion as the labor and material applied per day can be increased, the effect of per diem in absorbing the indirect allowance will diminish. With a little carelessness or delay in handling foreign cars, then the indirect portion of the allowance may be wholly absorbed in this one item.

Loss of Revenue

During periods of heavy demand for cars, the less time a car spends on the repair track the more time it is available for producing revenue, and its effect upon the net revenue can clearly be shown in the following manner:

Assume that the freight revenue per freight car mile, loaded and empty, is 20 cents, and that the average miles made per car per day is 30. Then such a road would be able to earn on the average a gross freight revenue of $6 per car per day. If its freight operating ratio was 75 per cent, then $1.50 per car per day would represent the net revenue from operation. Clearly, then, for every day a car is held out of service in bad order during periods of demand this would be a proper item to consider in the determination of what should or could be done to avoid such delay.

Switching

I believe it will readily be conceded that the present day cost of a switch engine, including rental and repairs, will vary from $10 to $14 per hour. If it is correct in principle to add a percentage to the direct expense for freight car repairs to cover the overhead and plant facilities, and I believe it to be, the same principle should apply in determining the cost of switching. Regardless of agreement with the principle suggested, take any rate you may see fit and measure it with the service actually performed to determine, if practical, what proportion of the indirect allowance switching may absorb. For the purpose of this illustration, let us use $10 per hour as the cost of a switch engine. Assume the simplest typical case involved in removing just one bad order car from an inbound train or transfer, which we will say consists of 40 cars. On an average 20 cars will need to be handled in cutting out the bad order to be placed upon a temporary hold track, which operation would consume on an average at least five minutes. It would also easily consume an average of five minutes per car to remove a string of cars from the temporary hold track to the repair track and space them a total of at least 10 minutes to put the car on the repair track, and the same amount of time to remove it, or, say, 20 minutes as a minimum. On the basis of $10 per hour, the cost for the four switches involved in cutting out a bad order and placing it on the repair track would be $3.33, or 66.6 per cent of the $5 to apply on the case previously cited, where $15 direct expense was applied in one day. Therefore, in proportion as the amount of labor and material applied can be increased for each time a car is switched to the repair track, the effect of switching expense in absorbing the indirect allowance will diminish.

It should be clearly borne in mind that the estimates of time consumed by a switch engine in setting out a bad order car is purposely intended to conservatively cover the simplest case, and does not cover those cases where, due to accumulations of bad orders, the cars are switched to outlying tracks and later culled over from time to time, the lightest repairs, etc., being selected, the cost for which latter method of handling is of course much greater than the above estimate.

Empty Car Mileage

A conservative estimate of the average out-of-pocket cost of the movement of an empty freight car per mile on the railroads of the United States at the present time, I should say, would be 5 cents, not including the per diem or mileage payments.

In proportion as the demand for box cars in good physical condition with which to load flour, sugar, grain, etc., in-

creases, with a given number of rough freight box cars circulating upon a road, the empty mileage and switching is bound to increase. A rough freight car may be suitable for loading l.c.l. or merchandise traffic, say to a branch line point where the outbound business is grain. But if such a car is used it must be hauled away empty and a grain car sent in, producing a cross-haul and unnecessary empty mileage. It is impossible definitely to say just what this item would amount to in dollars or cents, but that it is a vital factor at times is a well-known fact to any practical operating man.

M.C.B. Rule 120 provides that a foreign car in general wornout condition shall be reported to the owner with an estimate of the cost of making repairs. The owner has but two options, viz., to authorize the repairs, or the destruction of the car, wherever it may be located. Nevertheless, many roads, under special agreements between their mechanical departments, are moving such cars home for repairs. Unless such movements are authorized or concurred in by the transportation departments, decidedly uneconomical movements are likely to occur if factors other than the purely mechanical are considered. Before a proper decision can be made as to the economics of a case, the principal factor to be determined is, "Could the car, if repaired where located, be given a load in the direction it would otherwise move empty as a bad order?" If the answer is "Yes," then it is proper to double the mileage the bad order car would make to determine the total unnecessary empty mileage involved.

For example, a Pennsylvania box car at Ogden in bad order, if sent to the owner at Chicago would involve 1,500 empty car miles, and if the excess box car loading were eastbound, it would mean the necessity of moving some other box car empty westbound 1,500 miles, involving 3,000 excess empty car miles as compared with repairing the car at Ogden and loading it to Chicago. At 5 cents per car mile, this would mean an out-of-pocket expense to the carriers involved of at least $150. On the other hand, if a Southern Pacific car located at Chicago were safe to run, but otherwise would be considered a bad order, and the movement of empty box cars were westbound, it would be more economical to all concerned to send such car home and let the owners repair it, there being no excess empty car miles involved, and the owner could probably make the repairs for 20 per cent less than it would cost a foreign road to do so.

Loss and Damage

The A.R.A. Freight Claim Division has recently issued a memorandum indicating that practically 10 per cent of all freight claim payments made during the seven months ending March 31, 1921, aggregating $5,876,056, was paid on account of defective and unfit equipment; and $3,243,806, or 55 per cent, of the total payments on account of defective equipment was for grain, flour and sugar, grain alone amounting to $1,818,664, or 31 per cent.

There are, of course, many factors involved, but suffice it to say that the bad order situation appears to me to be vital, and one which can and should be improved.

When it is necessary to switch a car to a repair track and incur the transportation and per diem expense, regardless of the initials on the car, when practical the required work should be done thoroughly and expeditiously.

In other words, the rules should be made so that the signers of the agreement will observe Rule 1, and coincident therewith I feel sure there will follow reduced cost of freight car repairs and transportation expenses, as well as a reduction in the hire of equipment account.

La Follette Warns Against "Special Interests"

Opposition to Capper Bill Seen by Senator as Danger to "Consuming and Producing Millions"

WASHINGTON, D. C.

SENATOR LA FOLLETTE, in a speech in the Senate on December 22 and in a statement to the press on December 27, has been attacking an agreement said to have been made at a conference at Washington on December 9 attended by representatives of a number of large organization of shippers and of the railroad executives, at which some sort of understanding was reached that the agricultural organizations, because of rate reductions on agricultural products, would use their influence to oppose or withdraw their support from certain features of proposed legislation adverse to the railroads which they were convinced were also not in the interest of the shippers. Senator La Follette refers to this as a "secret meeting at which high officials of the railroads and the coal, steel and lumber interests attempted to enlist the farmers in an agreement whereby all agitation by the farmer interests for the repeal of section 15-a and for the restoration of state control over intrastate rates should cease." The "special interests," by which he apparently means those other than the farmer or labor interests, he says, were successful. In his speech Senator La Follette said he was reliably informed that an agreement was reached to rewrite the Capper bill so that only the clause directing the commission to make rates to produce as nearly as may be a return of 5½ to 6 per cent should be repealed and the remainder of the rate-making section, directing the commission to try to allow the railroads adequate revenues and to prescribe the percentage of return after March 1, should be left intact, as well as the provisions under which the commission has power to prevent state discrimination against interstate commerce.

Apparently the La Follette version of the conference reached the Senate before the reversal of the influence of the farm organizations had begun to make itself felt. Senator Capper, the reputed author of the bill which has formed the basis for most of the discussion regarding the proposed changes in the law, asserted that if any attempts were made to rewrite the bill Congress would hear from the farmers of Kansas. In his statement Senator La Follette gave a report of the conference which he called "a conspiracy to betray not only the farmers but the consuming and producing millions of the nation." This report follows in part:

"The great special interests represented at this conference were successful in obtaining the consent of certain of the farm representatives to such an agreement.

"This conference was participated in by the special committee representing the railway executives, of which Mr. Atterbury, of the Pennsylvania railroad, was chairman. It was held at the Racquet Club in Washington on December 9, 1921.

"There had been a previous conference in New York on September 21, of which Mr. J. R. Howard was made chairman. Those present at the Racquet Club meeting were Mr. W. W. Atterbury, of the Pennsylvania railroad; Howard Elliott, of the Northern Pacific; W. J. Harahan, of the

Chesapeake & Ohio; W. R. Storey, of the Atchison; R. S. Binkerd, who is assistant to the chairman of the Association of Railway Executives, New York.

"The iron and steel industries were represented by J. A. Campbell, of the Youngstown Sheet & Tube Company, of Youngstown, Ohio, and C. E. Bement, of Lansing, Mich., representing the Novo Engine Company.

"Railway supply organizations were represented by A. B. Johnson, president of the Railway Business Association, of Philadelphia, Pa., and Frank W. Noxon, secretary of the same association.

"Lumber interests were represented by Charles Hill, of the Southern Pine and Sales Corporation, of New York; A. B. Hammond, of the Hammond Lumber Company, of San Francisco, Calif.; J. H. Browne, of the Pacific Lumber Company, of New York City.

"Construction companies were represented by R. C. Marshall, Munsey Building, Washington, D. C., and E. T. Trigg, of Philadelphia, Pa.

"The National Industrial Traffic League was represented by W. H. Chandler, Boston, Mass., and J. H. Beck, Chicago, Ill.

"The National Association of Manufacturers was represented by J. A. Emery, of Washington, D. C.

"The agricultural interests were represented by J. R. Howard, Gray Silver; H. C. McKenzie, of New York; Ralph Snyder, of Kansas, and O. E. Bradfute, of Chicago. They were all of the American Farm Bureau Federation, the last three named being members of the legislative committee.

"The agricultural interests were also represented by V. I. Drummond, president of the International Farm Congress, and T. C. Atkeson, of the National Grange.

"Mr. Atterbury stated that the railroads desired the help of the interests represented in securing further wage reductions, and in opposing the amendments pending in Congress proposing repeal of section 15-a.

"After a considerable discussion the agricultural representatives, not being disposed to oppose the amendments absolutely, adjournment was taken for lunch, with the understanding that representatives of the carriers and of the agricultural interests would talk the matter out.

"After lunch Mr. Howard reported that the agricultural representatives were prepared to agree that section 15-a should not be amended, except for the removal of the proviso in paragraph 3, relating to the percentage of return for two years following March 1, 1920, which expires by statutory limitation in March next.

"It was left with a committee composed of Mr. Emery, Mr. Atkeson and Mr. Silver to rewrite the Capper bill, one of the measures proposing repeal of section 15-a."

The Senator did not explain which one of the conspirators was the source of his information or whether he got it second-hand. It is understood from other sources that the meeting in September was called for the purpose of promoting a round table discussion of common problems by leading representatives of the railroads and the shippers which resolved itself, however, into such a strenuous demand for lower rates that the railroads finally agreed to the 10 per cent reduction in rates on agricultural products as the best they could do at this time and promised to put into rate reductions, in accordance with the views of the Interstate Commerce Commission, any savings they may be able to make from a further reduction in wages. This was not entirely satisfactory at first to the shippers other than the agricultural group, and even the railroads had difficulty in reaching an agreement among themselves on the 10 per cent reduction.

At the meeting on December 9 the representatives of the farm organizations are said to have expressed appreciation of this action on the part of the roads and a willingness to do something to help the roads meet their problems, but when they were reminded that they had been supporting the Capper bill to emasculate the Transportation Act they were insistent upon the repeal of the so-called "guaranty rule." It appeared, however, that they were not so insistent upon repealing other provisions of the law.

A denial that there was anything "secret or unholy" about the Washington conference was made at Cleveland, after the issuance of La Follette's statement, by James R. Howard, president of the Farm Bureau Federation.

"Early in the conference an attempt was made to get an agreement to oppose the Capper bill, which repealed the guarantee clause of the Cummins-Esch bill and re-established the powers of the states in interstate matters," Mr. Howard said. "The farm representatives objected to this, standing firm for the repeal of all guaranteed returns and the integrity of state commissioners.

"Matters pertaining to reduced labor and other operating costs were discussed as well as the railway labor board, but no attempt to reach an agreement was made. This conference grew out of a former conference held at New York, September 21. At this meeting I personally made a plea for reduced rates on basic commodities and the direct result of this conference is the 10 per cent reduction on all agricultural products effective January 1.

"The 10 per cent reduction which the railroads voluntarily granted as a result of this conference will save the farmers approximately $100,000,000 during the next six months. Senator La Follette is reputed to favor government ownership and operation of railroads. The American Farm Bureau Federation has always advocated private ownership and operation."

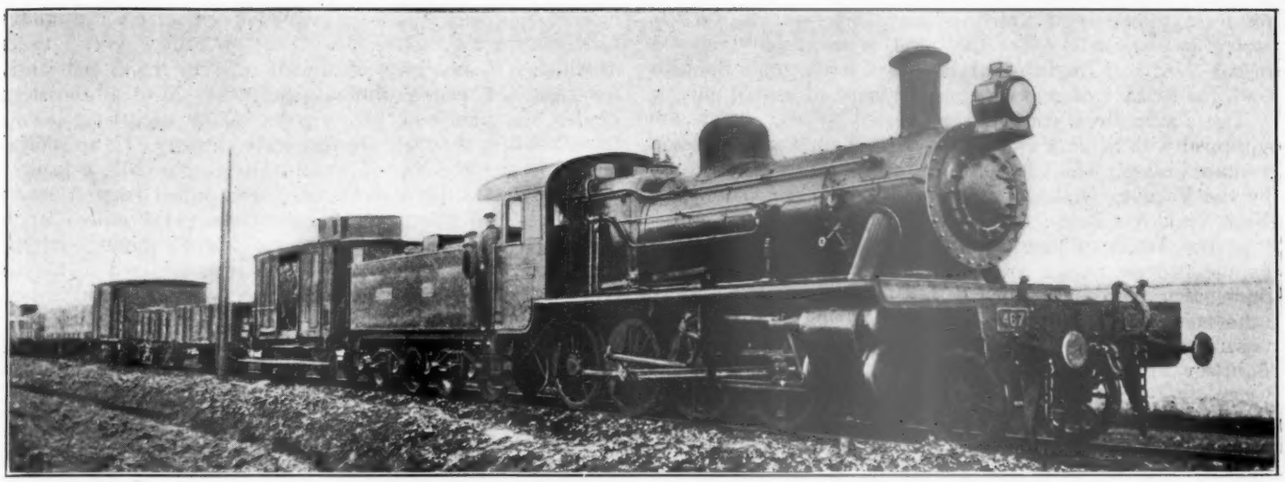
Senator La Follette took the position that some of the representatives of agriculture had been "captured" by the railroads and the trusts, but some others are asking if the farmers were the ones who were captured.

The railroads were unable, following the conference in New York in September and the further conferences between the executive committee of the Association of Railway Executives and the President, Secretary Hoover and the chairman of the Interstate Commerce Commission and various Congressional committees about the first of October, to agree on the 10 per cent reduction. The proposal was turned down at a meeting of the executives in Chicago on October 14, but after the Farm Bureau Federation had joined with the western state commissions in a formal case before the Interstate Commerce Commission and the commission had told the roads to make a more extensive reduction in the rates on grain, hay and grain products in the west the plan for a 10 per cent reduction was agreed upon by the roads on November 16. This was after the executive committee had held a conference with the commission at Washington on November 12. While the roads apparently expected to substitute the more general 10 per cent cut for the commission's order, the commission, under great pressure from the west and from Congress, declined to grant the postponement requested by the carriers and both reductions are now scheduled to go into effect.

At the oral argument before the commission on December 14, at which the roads asked that the grain order be suspended for six months, Clifford Thorne, appearing as counsel for the Farm Bureau Federation, urged that both reductions be made.

W. H. Chandler, president of the National Industrial Traffic League, who was present at the meeting, is said to have declined to be a party to any agreement and to have objected to discussing rate questions except in a public way.

In his statement Senator La Follette "warns the country" that the railroads are seeking to perpetuate the "guaranty" after March 1.



The Locomotive Is European in Appearance but American in Design

Locomotives for the Andaluces Railway of Spain

Consolidation Type of American Design for Use on Heavy Mountain Grades

THE Compania de los Ferrocarril Andaluces, which is the third largest railway in Spain, is located in a very mountainous section of the southern part of the country. Its main shops and the general offices of the director are located at Malaga, a seaport on the Mediterranean Sea. The railway touches on its extremities Belmez on the north, Grenada on the east, Algeciras on the south and Bonanza on the west. It has 1,302 kilometers (810 miles) of track open, having a 5 ft. 5¾ in. (1.67 m.) gage. Its rolling equipment consists of 198 locomotives, 611 passenger coaches, and 5,170 freight cars. It also operates three steamboats and one motor coach for inspection purposes.

Last year the Baldwin Locomotive Works completed and shipped 15 Consolidation (2-8-0) type locomotives to this railway. They were designed by the locomotive works along the general lines of a previous lot supplied by a British builder. Spain is dependent on foreign manufacturers for its locomotives, most of which have been made in England, Belgium, France, Italy and Germany. Only a small number have been furnished by American builders, but, according to reports, these few are giving good service.

The Andaluces Railway Runs Through a Picturesque Mountain Country

The locomotives have copper fireboxes and rocking grates. When the order was placed a plain bar cast iron grate was specified, but on account of the low grade of fuel used, it was later decided to change to the usual American type of rocking grates with a ⅝ in. air space between the bar fingers. The wisdom of this decision is borne out by the fact that the railway has reported an unusually low coal consumption

on these locomotives, which is very important as fuel is scarce and expensive. The fuel used is briquettes composed of one-third best English coal, one-third lower grade Spanish coal, the balance of coal dirt and a binder of asphaltum.

The locomotives employ superheated steam. They are equipped with Schlack cylinder lubricators and with Clayton vacuum brakes. The Clayton vacuum brake is manufactured by the Vacuum Brake Company, Ltd., of London and the New York Air Brake Company of New York, which controls the American manufacturing rights. Brakes as made by the two companies are exactly alike and the parts are interchangeable. At the time these Consolidation locomotives were being built, the Vacuum Brake Company of London was unable to furnish their brake apparatus in time for the Baldwin Locomotive Works to put it on and deliver the locomotives at the date specified in the contract so the material was purchased from the New York Air Brake Company. Reports from the railway company indicate their entire satisfaction with Clayton brakes of American manufacture.

Locomotive boilers for Spanish railways are tested under a Spanish law. This law requires the hydraulic test of the boiler to be made at a pressure of 17.25 kilograms per square centimeter (246 lb. per sq. in.) instead of 25 per cent above boiler working pressure as required by the Interstate Commerce Commission of the United States, which latter procedure is the one usually employed by American locomotive manufacturers. These boilers were built according to Baldwin Locomotive Works practice which specifies a test of somewhat greater severity than required by United States law. The Spanish test is most severe and gives testimony to the excellence of the boiler construction. The exact conditions to be met were not known at the time of manufacture and the boilers for these locomotives were given a shop test of 213 lb. per sq. in. The re-test at destination as made under Spanish law was at approximately 245 lb. per sq. in., or an excess of 15 per cent above the manufacturer's test and 22½ per cent above the test necessary under United States laws.

The locomotives were erected in the railway's own shop, which is a combination erecting and boiler shop 65 ft. high, 90 ft. wide, and 425 ft. long. In it are eight erecting pits, each long enough for two engines and served by an electric traveling crane of 30 tons capacity. The minimum erection time for these locomotives was 21 days, the maximum was 41 days and the average was 29.9 days.

The new motive power is now being used on the division between Alora and Gobantes. This route traverses a very mountainous part of the country, thus making a continuous haul for the locomotives for about 40 miles, several miles of which is a succession of tunnels with the tracks constantly wet from the seepage through the rocks. Most of the steep grades are combined with curves, many occurring in the tunnels where the rails are extremely slippery. In an official test of locomotive No. 467 hauling train No. 201, a load of 270 metric tons (298 short tons) was pulled from Alora to Gobantes, a distance of 19 kilometers (11.8 miles) up a ruling grade of three per cent, gaining 11 minutes on the scheduled time. The train hauled is considered a 15 per cent overload according to the railway company's calculations for tonnage allotment.

The most important dimensions, weights and factors of these locomotives are given in the table herewith.

Locomotive type	2-8-0
Service	Freight
Gage	5 ft. 5¾ in.
Tractive effort (85 per cent)	23,280 lb.
Cylinders, diameter and stroke	19 in. by 26 in.
Valves	Piston type
Weights in working order—	
On drivers	113,000 lb.
On front truck	22,000 lb.
Total engine	135,000 lb.
Tender	100,000 lb.
Total engine and tender	235,000 lb.
Wheel base—	
Driving	15 ft. 4 in.
Total engine	24 ft. 1 in.
Total engine and tender	49 ft. 5½ in.
Wheels and journals—	
Driving wheels, diameter over tires	55½ in.
Driving journals, main	8 in. by 8½ in.
Driving journals, others	7½ in. by 8½ in.
Front truck wheels	41 in.
Front truck journals	5½ in. by 10 in.
Boiler—	
Style	Straight top
Diameter, first ring, outside	60 in.
Steam pressure	160 lb.
Fuel	Briquettes
Firebox material	Arsenic copper
Firebox, length and width	73⅛ in. by 49⅜ in.
Grate area	25 sq. ft.
Tubes, number and diameter	132—1⅞ in.
Flues	21—5¼ in.
Tubes and flues, length	12 ft. 4 in.
Heating surface, firebox	126 sq. ft.
Heating surface, flues and tubes	1,146 sq. ft.
Heating surface, total	1,272 sq. ft.
Superheater surface	309 sq. ft.
Equivalent heating surface	1,736 sq. ft.
Tender—	
Water capacity	3,500 gal.
Coal capacity	7 tons
Wheels	38 in.
Ratios—	
Weight on drivers ÷ tractive effort	4.85
Tractive effort ÷ equivalent heating surface	13.4
Firebox surface ÷ evaporative surface, per cent	9.9
Tractive effort × dia. drivers ÷ equivalent heating surface	745
Equivalent heating surface ÷ grate area	69.5
Total weight ÷ equivalent heating surface	78
Superheater surface ÷ evaporative surface, per cent	24.3

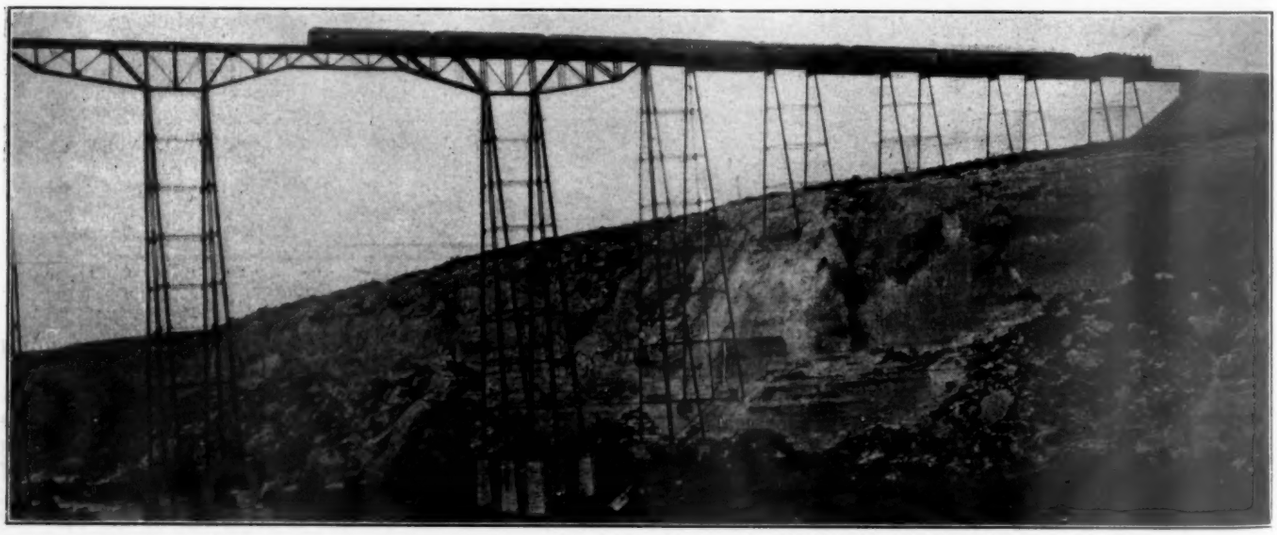


Photo by Underwood & Underwood

The Southern Pacific Crossing the Pecos River, Texas

Adopts New Methods for Handling Stationery

Describing the System Used by the Chicago, Milwaukee & St. Paul at Its Miles City Store

By R. H. Ewry
Stationery Storekeeper, C. M. & St. P., Miles City, Mont.

REORGANIZATION of the stationery department of the Chicago, Milwaukee & St. Paul Railway Company, has been in progress for the past year under the supervision of the general store department, of which stationery is one of the many branches, and has been systematized so that requisitions and supplies will be handled efficiently. There are two stationery supply stores on the system. The stationery storekeeper at Milwaukee Shops, Wis., supplies the points on lines east of Mobridge, S. Dak., and the one at Miles City, Mont., supplies all points west of Mobridge, to the Pacific coast. The Miles City store receives its stock of supplies from Milwaukee Shops, and on direct purchase requisitions.

Forms are arranged on the shelves so that a quick count of stock on hand may be taken at any time. The forms are placed face downward on the shelves as dust and atmospheric changes ruin the top sheets if the latter are exposed for any length of time.

All miscellaneous articles of stationery such as pins, erasers, rubber-bands, pencils, mimeograph ink, etc., are arranged on the shelves around or near the packing counter and are lined up as nearly as possible in the order in which they appear in the stationery stock book.

A stock requisition is placed each month with the general storekeeper by the stationery storekeeper for the supplies for the forthcoming 30 days on Form 1962, when it is a stock

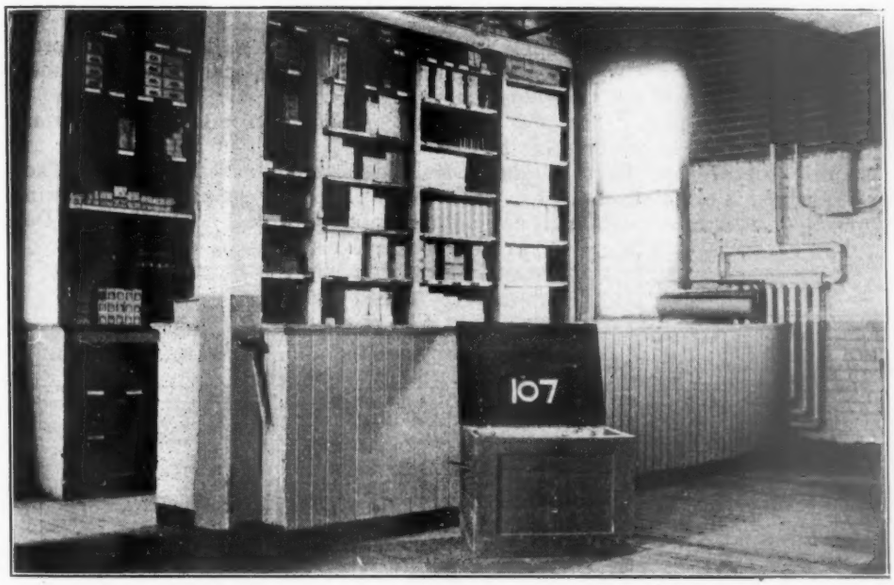


Fig. 1—Wrapping Counter and One of the Stationery Packing Boxes

Fig. 2—An Aisle in the Stationery Stock Room

The stationery stock is arranged on shelves in numerical order according to the stock books. Each bin is tagged. On the tag appears the form number, page and line on which it is listed in the stock book and the price per unit. As a speedy reference to the stock books, for purposes of pricing requisitions, if desired, and in ascertaining all data relative to any form when necessary, this system has proved satisfactory, especially when taking inventory and also when ordering the stock necessary for the next month.

Fig. 1 illustrates the order in which the miscellaneous articles are stored back of the wrapping counter; it also shows one of the stationery packing boxes, in which the larger orders for supplies are shipped. The packing boxes are numbered, and there is a record kept of point of destination. This is important as the box then can be traced and its return to the stationery department thereby assured. Small shipments of stationery are tied up in bundles and a paster placed on the package bears the address of the consignee. Fig. 2 shows an aisle in the stationery stock room.

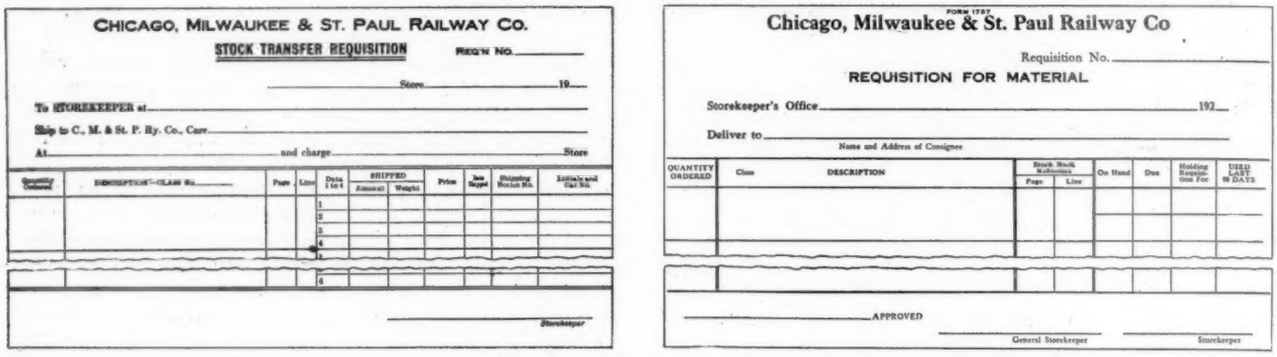
item, or on Form 1737, when it must be placed direct with the purchasing department. Forms 1962 and 1737 are illustrated in Fig. 3. It will be noticed that whether it is a stock item requisition or a direct purchase requisition, the data listed on these forms gives all the desired information necessary for the general storekeeper to have so that the desired amount can be ordered intelligently.

Form 1737-A (invoice record sheet) and Form 1737-B (receiving record sheet) shown in Fig. 4, are used as a record of invoices and records of shipments of material so that there may be no occasion for an error in passing an invoice. This is the most important part of the storekeeper's work as it prevents the passing of duplicate invoices and avoids passing invoices for material which has never been received.

The stationery storekeeper conducts his department on the same basis as a commercial concern. It is strictly debit and credit business. Nothing is ever delivered without Form 61 or 61-A, as shown in Fig. 5, properly approved, which is the same as cash to the storekeeper. On the return of articles

and forms, a charge-out credit is allowed, as shown in Fig. 5, on Form 1728, which is printed in red, so that disbursements can be made, debiting and crediting the proper accounts.

Requisitions for stationery must be approved by a designated officer of the particular department before they are filled. Form 61 is used by all persons ordering stationery. Form 61A (Fig. 6) has been adopted recently and will be


CHICAGO, MILWAUKEE & ST. PAUL RAILWAY CO.

STOCK TRANSFER REQUISITION

REQ'N NO.

Store 19

To STOREKEEPER at

Ship to C., M. & St. P. Ry. Co., Carr

At and charge Store

Chicago, Milwaukee & St. Paul Railway Co

FORM 1737

Requisition No.

REQUISITION FOR MATERIAL

Storekeeper's Office 192

Deliver to

Name and Address of Consignee

APPROVED

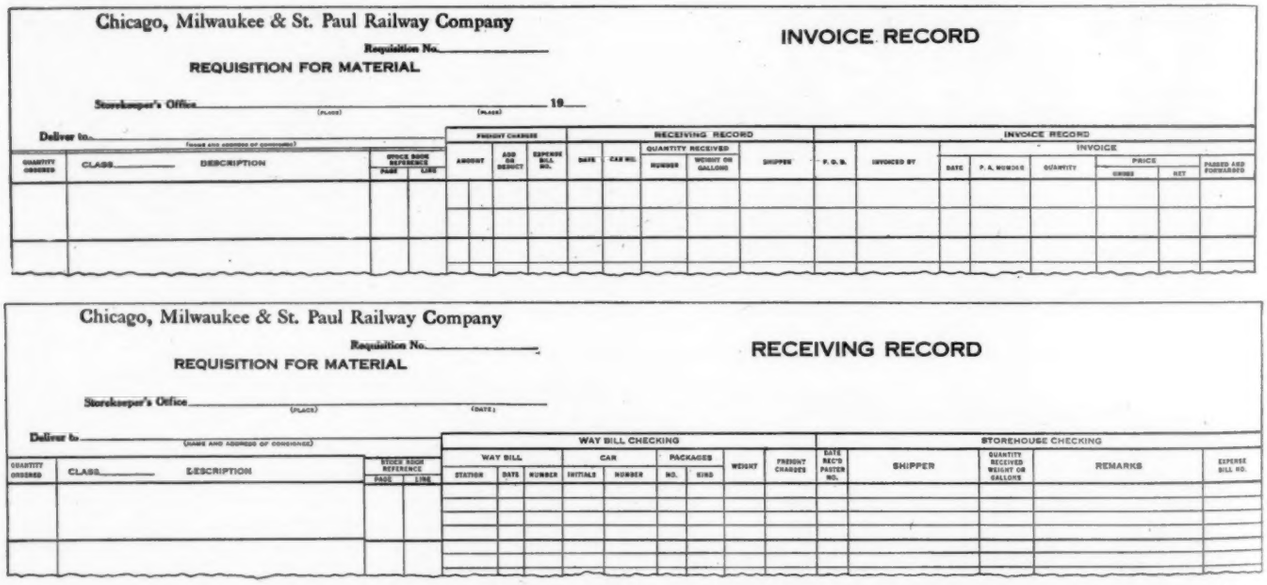
General Storekeeper Storekeeper

Fig. 3—Form 1962 (Left) Stock Transfer Requisition, and Form 1737 (Right) Requisition for Material. Full Size Both Forms 8¼ in. by 10¾ in.

put into effect at an early date. It is called the "Station Agents Stationery Stock Book." Both of these requisitions forms must be filled in complete by the agent before they are accepted to be filled. The agents' stock book is invaluable as a record of stationery disbursements for auditing and accounting purposes. Form 61 is made out by the agent and is enclosed in Form 61A when requisition is made for supplies. Form 61A is a means of assisting those, concerned about its use, in the conservation of stationery, as in this book are columns headed, "Form and Number," "Cost; Allotment," and under the caption designating the months of the year are two columns, one headed "On Hand," and the other "Ordered."

These two columns are filled in each time a requisition is placed for supplies, which is every other month or approximately every 60 days, and sent to the superintendent of each respective division for approval. This officer signifies his approval of the requisition by entering his name on the last page in the book opposite the name of the month the requisition is placed and forwards it to the traveling auditor of his division for O. K. The traveling auditor after checking, forwards Form 61 and 61-A to the stationer to be filled. The agent cannot order more than what he is allowed for 60 days, as shown in the column marked "Allotment." If an additional supply is desired, he must write a letter to the approving officer explaining why the additional amount as shown on the requisition, is needed.

The stock book is considered one of the most important records of the storekeeper, as shown in Fig. 7. In it are listed all the forms and material carried in stock. Each month when an order is placed for supplies, the following data must be shown in spaces provided: "On Hand," "Due


Chicago, Milwaukee & St. Paul Railway Company

REQUISITION FOR MATERIAL

Requisition No.

Storekeeper's Office 19

Deliver to

INVOICE RECORD

Chicago, Milwaukee & St. Paul Railway Company

REQUISITION FOR MATERIAL

Requisition No.

Storekeeper's Office

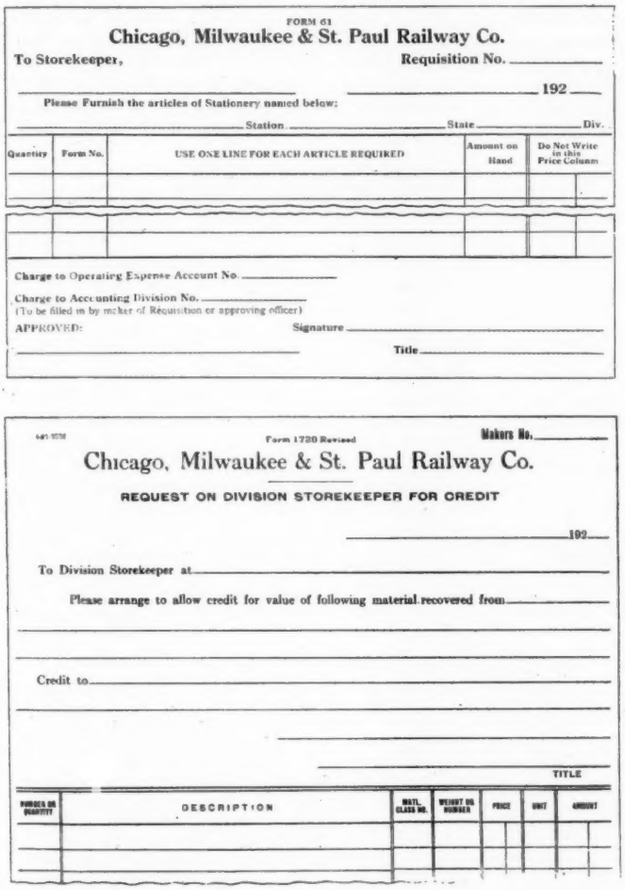
RECEIVING RECORD

Fig. 4—Form 1737-A (Above) Invoice Record Sheet, and Form 1737-B (Below) Receiving Record Sheet. Full Size 19½ in. by 10¾ in.

on Requisitions"; "Holding Orders For"; "Used Last 30 Days"; and "Surplus." The amount ordered is placed in the column marked, "Ordered." The requisition number is placed opposite the amount ordered in the column provided, and when supply is received the amount ordered is circled and the date on which it was received is placed under the circle. These stock books are lined up to run for one year without new inserts being placed in the books. This system

of stock-keeping is beyond doubt the most practicable method of stock records, as it affords all the information necessary for an efficient record and check on all classes of material.

Office supplies; all office furniture and fixtures; photographic supplies; ticket cases; blue print machines and postage stamps are requisitioned and supplied by the stationery storekeeper. When the price of these articles is considered together with the cost of stationery and printing at the present time, strict conservation must be practised by each individual during this period of retrenchment, if the money spent annually for these supplies is to be appreciably



FORM 61

Chicago, Milwaukee & St. Paul Railway Co.

To Storekeeper, Requisition No. _____

_____ 192__

Please Furnish the articles of Stationery named below:

_____ Station _____ State _____ Div.

Quantity	Form No.	USE ONE LINE FOR EACH ARTICLE REQUIRED	Amount on Hand	Do Not Write in this Price Column

Charge to Operating Expense Account No. _____

Charge to Accounting Division No. _____
(To be filled in by maker of Requisition or approving officer)

APPROVED: Signature _____

Title _____

Form 1728 Revised Makers No. _____

Chicago, Milwaukee & St. Paul Railway Co.

REQUEST ON DIVISION STOREKEEPER FOR CREDIT

_____ 192__

To Division Storekeeper at _____

Please arrange to allow credit for value of following material recovered from _____

Credit to _____

TITLE

NUMBER OR QUANTITY	DESCRIPTION	MATL. CLASS NO.	WEIGHT OR NUMBER	PRICE	UNIT	AMOUNT

Fig. 5—Form 61 (Above) and Form 1728 (Below). Form 1728 Is Printed in Red. Full Size, 7 in. by 8¼ in.

reduced. The following suggestions are given with that end in view:

Repeat envelopes (1523 and 1524) should be used for company business whenever possible, and all communications for the same office, whenever practicable, should be enclosed in the one envelope at the close of each day's business. Use company letterheads and envelopes (1506 and 1510) only for outside correspondence. Use plain paper for company business, and the small size plain paper whenever possible. Do not make two or more carbon copies of a letter unless it is positively required.

Carbon paper is costly—it is hard to obtain. Use each sheet as long as a legible impression can be made. All carbon paper not in actual use should be put in a box or envelope to prevent drying out and be kept away from heat.

Mimeograph machines and supplies are costly stationery articles. Special care should be taken of the stencils and also ink. Keep both articles away from heat and exposure to changes in temperature whenever possible.

All miscellaneous articles such as pencils; rubber bands; paper fasteners; ink and erasers, should be placed in charge of a capable employee in each large office or department who should be held responsible for their care and proper issuance.

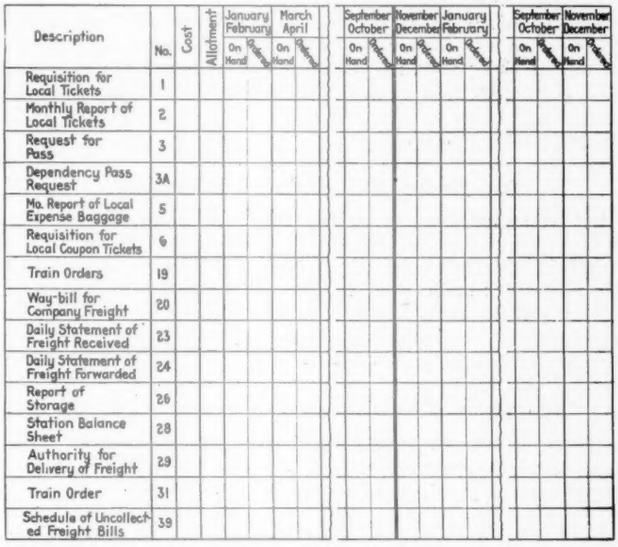
It is expensive to use printed forms for figuring pads. Obsolete forms or scratch pads should be used.

When ordering stationery, confine your request to actual requirements.

When a mistake is made, don't destroy the sheet, but use an eraser; it is furnished for that purpose.

It is a very wasteful practise to use plain envelopes (1506 and 1510) when repeat envelopes (1523 and 1524) will serve the purpose.

Pencil extensions are furnished to prolong the use of each lead



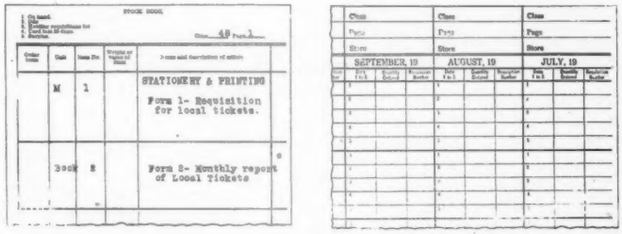
Description	No.	Cost	Allotment	January February On Hand	March April On Hand	September October On Hand	November December On Hand	January February On Hand	September October On Hand	November December On Hand
Requisition for Local Tickets	1									
Monthly Report of Local Tickets	2									
Request for Pass	3									
Dependency Pass Request	3A									
Mo. Report of Local Expense Baggage	5									
Requisition for Local Coupon Tickets	6									
Train Orders	19									
Way-bill for Company Freight	20									
Daily Statement of Freight Received	23									
Daily Statement of Freight Forwarded	24									
Report of Storage	26									
Station Balance Sheet	28									
Authority for Delivery of Freight	29									
Train Order	31									
Schedule of Uncollected Freight Bills	39									

Fig. 6—Form 61-A, Station Agent's Stationery Requisition Book

pencil. When a pencil is half used, slip on the extension, it will serve you as well as a new one.

Departments having mimeograph machines should avail themselves of the saving made possible by the use of Form letters. By so doing, it will reduce the purchases of letter paper, and typewriter ribbons.

It is advisable to ship all waste paper in packing boxes when they are returned to the stationery storekeeper, as the company can



STOCK BOOK

Order Number	Unit	Item No.	Weight or Number of Items	Item and Description of Article
	M	1		STATIONERY & PRINTING
				Form 1- Requisition for local tickets.
	Book	2		Form 2- Monthly report of Local Tickets

Class	Class	Class
Page	Page	Page
Store	Store	Store

SEPTEMBER, 19			AUGUST, 19			JULY, 19		
Date Rec'd	Item No.	Quantity Ordered	Number Rec'd	Item No.	Quantity Ordered	Number Rec'd	Item No.	Quantity Ordered
1	1		1	1		1	1	
2	2		2	2		2	2	
3	3		3	3		3	3	
4	4		4	4		4	4	
5	5		5	5		5	5	
6	6		6	6		6	6	
7	7		7	7		7	7	
8	8		8	8		8	8	
9	9		9	9		9	9	
10	10		10	10		10	10	

Fig. 7—Storekeeper's Stock Book. Portion Shown on Left Is Printed on Yellow Paper, Full Size with Space for 10 Items 5½ in. by 13¼ in. Portion Shown on Right Printed on White Paper Both Sides. Space for Six Months on Each Side. Full Size 10¾ in. by 13¼ in.

realize an appreciable figure by selling it, as there is a market value for all waste paper.

Save stationery.
Take care of your individual supply.
All haste makes a waste of stationery forms.
Top sheet of a pad of forms should be used, not destroyed.
It is the smaller items that run into big figures.
Order only what you need.
Not what you use, but what you save, is what counts.
Every item of stationery wasted is a direct loss.
Regard stationery as a personal representative of your desk.
Your allotment of stationery supplies cost money; if you were paying for them you would not waste them.

NEAR WILLIMANTIC, CONN., on December 21, in a collision between a passenger train and a locomotive on the New York, New Haven & Hartford, 14 passengers were injured, none seriously.

General News Department

Returns of 91 Class I roads to the Interstate Commerce Commission for November show a net railway operating income of $38,000,000, an increase of 35 per cent as compared with November last year. The operating revenues show a decrease of 22.2 per cent, while the operating expenses were reduced 29.5 per cent.

Air Brake Association Convention

In the announcement of the 1922 convention of the Air Brake Association in the issue of December 24, both the Hotel Washington and the Ebbitt Hotel were mentioned, but it was not made clear that the headquarters of the association will be at the Hotel Washington. The new Ebbitt Hotel will be used only to provide accommodation for those who are unable to obtain rooms in the Hotel Washington.

Rumors of Electrification of the T. & N. O.

The reports which have gained some currency regarding the development of hydro-electric power on the Abitibi river by the Temiskaming & Northern Ontario, are somewhat premature. The extension of this railway will cross the Abitibi river at the Long Sault rapids. It is probable that there will be a development of this water power, but whether it will be as a part of a pulp and paper mill, or simply as a hydro-electric power development is at present uncertain.

The Long Sault has been considered as a source of power in connection with the proposed electrification of the railway. It is not probable that the work of electrification can be commenced under existing financial conditions, but it is probable in any further development of water powers on the Abitibi river, the provincial government will give due regard to the requirements of the pulp and paper, and mining industries, as well as the requirements of the Temiskaming & Northern Ontario for hydro-electric power.

Wage Statistics for August

The Interstate Commerce Commission has issued the second of its new series of monthly reports of wage statistics giving figures for the month of August, when the number of employees of the Class I steam roads was 1,679,927, as compared with 1,634,872 in July and the total compensation was $227,745,895, as compared with $214,339,385. The report says the increase was principally due to an increase in the number of straight time hours per employee, there having been a small decline in the number of overtime hours paid for.

The report gives average earnings for the month, based on the number of employees at the middle of the month, for the various groups of classes of employees as follows:

	Daily Basis	Hourly Basis
Executives, officials and staff assistants	$417	....
Professional, clerical and general	178	$126
Maintenance of way and structures	236	93
Maintenance of equipment and stores	248	134
Transportation, other than train engine and yard	99	124
Transportation, yardmasters, switch tenders and hostlers	258	143
Transportation, train and engine	....	181

Progress on Contract Standardization

Definite progress is recorded for the two-day conference held at Washington on December 15 and 16 for the standardization of construction contracts. Those present included representatives of associations of railway and highway engineers, architects, contractors and others. The meeting was opened with an address by Herbert Hoover, secretary of commerce, who extended the assistance and co-operation of his department in the fullest measure. The conference elected officers as follows: Chairman, Onward Bates of Chicago, representing the Western Society of Engineers; vice-chairman, J. W. Cowper of Buffalo, N. Y., representing the Associated General Contractors, and secretary, W. P. Christie of Washington, D. C. After a general discussion of the problem of the universal contract form, a committee was appointed to prepare a tentative form for general contract clauses, this committee consisting of General R. C. Marshall, representing the Associated General Contractors; W. S. Parker, representing the architects, and W. D. Faucette, chief engineer of the Seaboard Air Line, representing the railway engineers.

Floods Causing Trouble

Heavy rains in the Ohio river valley and the state of California have caused the railroads considerable damage and inconveniences at certain points in these regions. The greatest damage was done at San Diego, Cal., which city was completely isolated for several days as it was necessary to suspend traffic on both the Atchison, Topeka & Santa Fe and the San Diego & Arizona on December 25. The Santa Fe lost 1,000 ft. of track and roadway near Sorrento, and in the Rose Canyon and there were small washouts at several other points, while the bridge over the San Diego river was threatened. In the Ohio region, it was necessary for the Cleveland, Cincinnati, Chicago & St. Louis, the Southern and the Baltimore & Ohio to abandon the Central Union station at Cincinnati temporarily because of high water. Service was not resumed at this station, except for one or two local trains operated on a track above the water line, until December 28. While little damage was done at this point the railroads here and at other points on the river experienced a great deal of inconvenience from the high water.

Report on Collision at Manhattan Transfer

The Interstate Commerce Commission has issued a report, dated November 21, and signed by W. P. Borland, chief of the Bureau of Safety, on the rear collision of westbound passenger trains which occurred on the Pennsylvania Railroad near Manhattan Transfer, N. J., on the morning of October 28, about 12:30 o'clock, when 38 passengers, four Pullman employees and four railroad employees were injured. There was a dense fog at the time, and express train No. 103, consisting of electric Motor No. 11 and 12 sleeping cars, moving at from 10 to 25 miles an hour, ran into the rear of a preceding train, No. 701, which had been brought to a stop about one mile east of Manhattan Transfer station. Train 103 had run past two automatic block signals set against it, one at caution and the other at stop; a second stop signal 271 ft. in the rear of the standing train; and also past a flagman and fusee and torpedo signals; although the flagman and the fusee and torpedoes were not very far back from the standing train.

The flagman is censured for not affording his train proper protection. If his train had been moving at ordinary speed, he had from seven to 10 minutes in which to go back; while if it had been moving slowly, he ought to have thrown off fusees, which he did not do.

The engineman at fault admitted that he passed the two automatic signals without observing their indications; and he did not make a sufficient reduction of speed. The engineman's helper on train 103 is also held at fault for failure to observe the signals and to warn the engineman that signal locations had been passed without the indications being seen.

The line between Pennsylvania Terminal, New York, and Manhattan Transfer, nine miles, double track, is equipped with automatic block signals for the movement of trains in either direction on either track; and, in addition, automatic

stops are provided on that portion of the line which is in tunnel; at the entrances to the tunnel and at the approaches to a drawbridge, about two miles east of the point of collision. The report indicates that no reason was disclosed why automatic stops had not been installed on the track at every block section throughout this nine miles, all electric motors running over the line being equipped with train-stop apparatus; and "to prevent the recurrence of accidents of this character, it is recommended that the installation of the automatic train stop system be extended" to cover the whole of this line.

All of the cars involved in the collision were of steel; and the report declares that if any one of them had been of wood there probably would have been loss of life.

Wood Preservers' Convention Program

The following is the program of the convention of the American Wood Preservers' Association to be held on January 24-26, at the Hotel Sherman, Chicago:

TUESDAY, JANUARY 24, 10.30 A. M.

Invocation, address of welcome and opening business.

Effect of Heat on Wood-Destroying Fungi in Mills, by Dr. Walter H. Snell.

2 P. M.

Committee report on Preservatives, A. L. Kammerer, chairman.

A Theory on the Mechanism of the Protection of Wood by Preservatives, by Ernest Bateman, chemist, Forest Products Laboratory, Madison, Wis.

Committee report on Utilization and Service: Economics, Kurt C. Barth, chairman; Track, S. D. Cooper, chairman; Flooring and Paving, L. T. Ericson, chairman.

What Constitutes Reliable Service Records, by M. F. Deutsch, statistician, Forest Products Laboratory, Madison, Wis.

The Economics of Cross Tie Renewals, by V. K. Hendricks, Terre Haute, Ind.

Factors Affecting the Cost of Treated Cross Ties, by E. E. Pershall, vice-president, T. J. Moss Tie Company, St. Louis, Mo.

Photography and Wood Preservation, by Henri Strawn, photographer, Atchison, Topeka & Santa Fe, Topeka, Kans.

WEDNESDAY, JANUARY 25, 10 A. M.

Feasibility of Using Tropical Hardwoods for Railroad Ties in this Country, by Nelson C. Brown, American Woods Export Association, New York.

Committee report on Treatments: Ties—Fir, R. H. Rawson, chairman; Lumber—Car, W. J. Smith, chairman; Treated Car Sills and Decking, F. S. Shinn; Poles—Pressure and Non-pressure Treatments, R. F. Hosford, general chairman; Wood Pipe, H. E. Horrocks, chairman; Creosoted Wood Stave Pipe, H. D. Coale, chairman; Inspection, J. R. Keig, chairman.

Should the Increased Cost of Treating Tires be Charged to Maintenance or Capital Account?, by Earl Stimson, chief engineer of maintenance, Baltimore & Ohio, Baltimore, Md.

Lumber Drying by Vacuum, by O. E. Jacobs.

2 P. M.

Growing Need for Preservation of Mine Timbers, by R. R. Horner.

Why Preserve Mine Timbers? by George M. Hunt, chemist, Forest Products Laboratory, Madison, Wis.

Decay of Timber in Mines, by C. J. Humphrey, pathologist, Bureau of Plant Industry, Madison, Wis.

Committee report on Plant Operation: Peeling Ties, F. S. Pooler, chairman; Adzing, Boring and Perforating Layouts, D. W. Edwards, chairman; Car Loading, A. E. Larkin, chairman; Insurance, W. E. Doan, chairman, Pressure Machinery, E. E. Alexander, chairman; Material, Handling, A. H. Onstad, chairman.

THURSDAY, JANUARY 26, 10 A. M.

Confidence in the Industry, by R. S. Manley, president, Creosoted Materials Company, New Orleans, La.

Committee report on San Francisco Bay Marine Piling, F. D. Mattos, chairman.

Committee report on Gulf Coast Marine Piling Survey, E. E. Boehne, chairman.

American Shipworms, by Paul Bartsch.

Closing business.

Traffic News

H. A. Jones, formerly traffic manager for the Columbian Steel Tank Company, Kansas City, Mo., has been appointed traffic manager for the Rudy-Patrick Steel Company, Kansas City, Mo.

North Pacific Coast traffic representatives met at Seattle, Wash., on December 23, to confer on reductions and revisions in switching rates at all northwest terminal cities, including Portland. The present switching rates came into effect during the war.

The Senate on December 22 adopted a resolution introduced by Senator Ladd of North Dakota directing the Federal Trade Commission to make an investigation and report regarding the facts relating to the exportation of wheat and other grain, including the freight and other costs of handling.

Reductions of rates on coal from Chicago to Pacific Coast points were announced by the Southern Pacific on December 21, the effective date to be set later. The company has also extended the privilege of fabricating in transit of iron and steel tank plates in shipments originating in Chicago and west when shipments are destined for Pacific Coast points.

J. A. McNaughton, formerly traffic manager for the Cudahy Packing Company, Chicago, has been appointed traffic manager for the Stock Yards Company, Los Angeles, Cal. J. W. Robb, succeeds Mr. McNaughton with the Cudahy company. B. E. Reed, assistant traffic manager of the first named company, has been appointed traffic manager for the California Fruit Growers' Exchange, Los Angeles, and has been succeeded by C. O. Cornwall.

In defending the western sugar rate to Chicago at a hearing conducted by the Interstate Commerce Commission at San Francisco, Cal., on December 14, H. R. Howard, sales manager of the Western Sugar Refinery, San Francisco, testified that the lower price of raw products on the Pacific Coast did not handicap the eastern refineries because the eastern refineries, through subsidiary companies, own plantations. Eastern roads maintain that the present freight rates on sugar from the Pacific Coast to Chicago unduly handicap the shipment of Louisiana, Cuba and Porto Rican sugar to the Chicago market.

Coal Production

Coal production declined again during the week ended December 17, according to the weekly bulletin of the Geological Survey, and established a new low record for this season of the year. The output of bituminous is estimated at 7,046,000 net tons.

Senate to Take Up Mileage Book Bill

An effort will be made in the Senate on January 11 to pass a bill to require the railroads to sell interchangeable mileage books at 2½ cents a mile. On motion of Senator Robinson of Arkansas on December 22 the Senate entered into a unanimous consent agreement to dicharge the committee on Interstate Commerce from further consideration of the bill S. 848, which provides for the issuance of a mileage book at 2½ cents, by amendment of section 22 of the interstate commerce law, and to take up the consideration of the bill on January 11. A number of similar bills have been introduced in Congress but no action has been taken upon them by the committees. An effort was made to attach one of them to the tax bill as a rider but it failed because it was not germane to the bill and also because several senators expressed themselves as greatly opposed to Congress legislating directly to fix a rate of fare itself. Senator Robinson put into the Congressional Record a statement in which he said that "there is no one thing that contributes more to the high cost of living than the high cost of railroad travel and railroad freight and express rates."

Commission and Court News

Interstate Commerce Commission

The commission has suspended until April 26 the operation of schedules published by the Erie and the Pennsylvania which provide reductions in the rates on iron ore from Lorain, Toledo and Cleveland, to various destinations in Official Classification territory. For example the present rate on iron ore from Cleveland to Cumberland, Md., is 174½ cents a ton, and the proposed rate 170½ cents.

The commission has further suspended until February 12 the operation of certain schedules published in supplements issued by R. H. Countiss, agent. The suspended schedules in Supplement No. 1 propose to restrict the routing on lumber and articles taking same rates destined to eastern points so as not to apply via any junction in connection with the Atchison, Topeka & Santa Fe, Gulf, Colorado & Santa Fe or Pan-Handle & Santa Fe, from points in California, Nevada and Utah in the Hawley and Truckee groups, leaving applicable instead combination rates; and Supplement No. 2 proposes to substitute, for the combinations proposed to apply, the Coast group rates from points in the Hawley and Truckee groups, the operation of which was suspended until January 13, 1922, by an order previously entered.

Rate for Grain Rate Reduction Postponed

The Interstate Commerce Commission on December 23 authorized the western railroads to make the reduction in rates on grain, grain products and hay effective on January 7 on one day's notice, instead of on December 27, on five days' notice, as provided in the commission's order. This was done because it appeared to the commission that it was physically impossible for many of the carriers to publish the tariffs by that date even on one day's notice.

New England Roads Included in Agricultural Rate Cut

The Interstate Commerce Commission on December 22 granted permission to the New England railroads, at their request, to make the general 10 per cent reduction in rates on agricultural products which is to be put into effect on January 1 by the other roads. In the original plan the New England lines were excepted because of their financial condition.

Coal Rate Reductions Suspended

The commission has suspended until April 24 the operation of certain schedules published by the Chesapeake & Ohio and the Louisville & Nashville which propose reductions in the rates on bituminous coal from mines to destinations on the Southern Railway in Indiana and Illinois. The following shows the present and proposed rates in cents per net ton on bituminous coal from Chesapeake & Ohio mines in the Kanawha and Big Sandy Districts to destinations indicated:

To—	Present	Proposed
Muren, Ind.	364	347
Oakland City, Ind.	364	347
Mt. Carmel, Ill.	378	347
Centralia, Ill.	413	347
East St. Louis, Ill.	413	347

Bingham & Garfield Hearing Closed

The hearing conducted by H. B. Wilson, examiner for the Interstate Commerce Commission in conjunction with three members of the Public Utilities Commission of Utah, to determine whether the Bingham & Garfield is a plant facility of the Utah Copper Company or a common carrier, closed at Salt Lake City on December 18. The copper company, under a contract with the railroad, guarantees the railroad a return of 6 per cent on its investment. The copper company owns the railroad outright, and claims the contract is legal and regular on the ground that to all intents and purposes the railroad is a plant facility. The company, therefore, seeks to avoid payment of one-half of all over 6 per cent net profits into a common fund of all the railroads of the country as provided for in the Transportation Act. For all years since that ending June 30, 1912, the net railway operating income has been more than 6 per cent of the book value; and as high as 24.35 of that value in the year ending December 31, 1916.

Reduction in Coal Rates by Ford's Railroad Not Permitted by I. C. C.

The Interstate Commerce Commission has issued its decision on the proposed reduction by the Detroit, Toledo & Ironton in the interstate rates on coal in carloads from mines on its line in the Jackson county and Ironton groups in Ohio to Toledo, Detroit and other destinations, ordering that the tariffs be cancelled on the ground that they are unduly preferential of such mines and unduly prejudicial to mines on other lines in the same and other groups in Ohio and other states. The tariffs had been suspended since September 3.

The opinion, by Commissioner Esch, says that the financial condition of the railroad might warrant the proposed reduction, provided the issue could be decided solely upon that basis; but, a proper relationship between competitive groups is in many respects of greater importance to the shipping public than the measure of the rate itself, and the suspended schedules involved not only respondent's local coal rates, which are but a few of the many coal rates interwoven in the rate structure from the mines. Thus viewed, it is said, the commission would not be warranted in permitting the establishment of rates which would disrupt the rate relationship fixed by the commission and which has existed for many years. The report says the reduction contemplated by the suspended tariffs is merely a part of a general reduction in the interstate and intrastate rates of respondent upon all commodities. All other reductions in its interstate rates have been allowed to become effective.

State Commissions

The Railroad Commission of Tennessee has summoned all the railroads of the state to appear on January 6 and show cause why the commission should not order the discontinuance of the surcharge of 50 per cent on railroad tickets of passengers riding in parlor and sleeping cars.

The Railway Commission of Nebraska on December 17, sent a protest to the Interstate Commerce Commission against the proposed issue of $73,000,000 of bonds by the Chicago, Burlington & Quincy to reimburse the company's treasury for money spent in improvements in the years 1916 to 1921, and an issue of $30,000,000 for additions and betterments to be made in 1922.

The Public Service Commission of Alabama has postponed until February 6 the date for its hearing in connection with proposed reductions in freight rates on the railroads of that state. It is said that the Alabama Shippers' Association requested this postponement because hearings are being held, on the same general subject, by the Interstate Commerce Commission.

The California Railroad Commission has ordered that all auto stages engaged in the transportation of passengers in California shall stop between 50 ft. and 75 ft. from steam railroad or interurban electric tracks, before crossing, and the stage driver must then look up or down the track to be sure there is no train approaching. Within municipalities the rule does not apply either at electric or steam railroad tracks.

Personnel of Commissions

The Senate committee on interstate commerce on December 20 voted to recommend to the Senate confirmation of the nominations of Commissioners Aitchison and Hall for reappointment to the Interstate Commerce Commission but the Senate failed to act before taking an adjournment to January 3. As the commissioners' terms expire at the end of the year this will leave vacancies until the Senate acts. It is understood that Senator LaFollette and some of the Southern Senators who think a Southern man should have been appointed will make some opposition to the appointment of Mr. Hall.

Foreign Railway News

Golfers as Passengers

LONDON

The Great Western is issuing special facilities for the benefit of golfers on their line. Tickets are issued inclusive of hotel accommodations, rail journey and conveyance from station to hotel and from hotel to golf links. This is a new departure in Great Britain and it is believed will be a valuable attraction to traffic.

General Manager of North Eastern (England) to Retire

LONDON

Sir Alexander Kaye Butterworth, general manager of the North Eastern Railway, is to retire at the end of the present year. Sir Alexander has held this position since 1906. He will, however, remain in the service of the company until the new amalgamation (North Eastern, Eastern and East Scottish Group) is formed in order that he may give his advice and assistance in all matters relating to the amalgamation. R. L. Wedgwood, C. B., C.M.G. is to be appointed general manager as from January 1, 1922. Mr. Wedgwood has held the position of deputy general manager since August, 1919.

The Great Western's New Mechanical Chief

LONDON

C. B. Collett, who has been appointed as chief mechanical engineer of the Great Western (England) succeeding G. J. Churchward, C. B. E., who is retiring from that position at the end of the present year, served his apprenticeship with Maudslay Son & Field, of London, and entered the service of the Great Western Railway in 1893 at Swindon as draughtsman. He subsequently filled the position of chief draughtsman and was appointed in 1900 technical inspector of the Swindon locomotive works. In 1901 Mr. Collett was appointed assistant works manager and in 1913 was promoted locomotive works manager. He has acted as deputy chief mechanical engineer since May, 1919.

Railway Electrification in South Africa

The South African Railways have decided to defer electrification of the Durban-Pietermaritzburg section of the main railway from Durban to Johannesburg, and to electrify the track between Pietermaritzburg and Glencoe Junction instead, according to the Times (London) Trade Supplement. The section to be converted consists of 171 miles of single track, and preliminary work has already been begun. The change of plans is doubtless due to the lessened urgency of dealing with the coast section resulting from the recent completion of a new route between Pietermaritzburg and Durban, which, with other improvements, provides two tracks from the provincial capital to the port. Further, there are long and severe gradients against down traffic between the coalfields in Northern Natal and Pietermaritzburg, and this, combined with the fact that only one track exists, renders electrification of the inland section more immediately advantageous. It will also avoid the necessity for hauling fuel 240 miles to the generating station, since under the revised scheme the power plant will be built at Glencoe Junction, in the coal-producing district.

TWO MEN caught by the police in Chicago on December 23—one of them being killed—proved to be bandits who had held up Union Pacific passenger train No. 7, near Clearfield, Utah, on August 31. A reward of $1,000 had been offered by the railroad company.

PASSENGER TRAIN No. 7, of the Southern Railway, was derailed near Anniston, Ala., on December 19, and the engineman, fireman and one mail clerk were killed. The engineman was Rev. Samuel T. Watkins, he having been a clergyman of the Baptist Church for 37 years, devoting a part of his time to religious work. He had spent much time in visiting prisons in Georgia and Alabama.

Equipment and Supplies

Locomotives

THE DETROIT & MACKINAC is having repairs made to 1 locomotive at the shops of the Baldwin Locomotive Works.

THE LEHIGH & HUDSON RIVER is having repairs made to 2 Consolidation type locomotives at the shops of the Baldwin Locomotive Works.

Freight Cars

THE PHILADELPHIA & READING is inquiring for from 500 to 2,000, 70-ton hopper cars.

THE BENGAL & NORTH-WESTERN is inquiring through the car builders for 25 timber trucks.

THE ASSAM BENGAL (India) is inquiring through the car builders for 100 covered goods wagons.

THE BANGOR & AROOSTOOK is applying steel underframes to 250 box cars in its shops at Derby, Me.

THE SOUTH INDIAN RAILWAY is inquiring through the car builders for prices on 100 steel covered goods wagons.

Iron and Steel

THE ILLINOIS CENTRAL has awarded a contract to the Decatur Bridge Company for 675 tons of steel for the repair shop at McComb, Miss.

THE NORFOLK & WESTERN has placed contracts for 40,000 tons of rail for 1922 requirements. The tonnage was divided between several mills.

Machinery and Tools

THE VIRGINIAN RAILWAY is asking for bids on a 200-ton wrecking crane.

Miscellaneous

THE NEW YORK CENTRAL and subsidiary lines are asking for bids until 12 o'clock noon, January 10, 1922, for the requirements of these companies for a minimum of 5,000 and a maximum of 6,000 steel wheels for locomotive, passenger car and tender repairs.

THE CHICAGO & NORTH WESTERN is inquiring for 553 barrels of oil of different grades and 60 cases of Polar cup grease. This company is also inquiring for 55,000 gal. of Fortnite long-time burning and mineral seal oil for the period ending June 30, 1922; also for its requirements of gasoline and kerosene by tank wagon delivery at various stations on the line in the states of Illinois, Wisconsin, Michigan, Minnesota, South Dakota, Iowa and Nebraska for the period ending December 31, 1922; also inquiring for approximately 100,000 gal. of kerosene in steel drums, 110 deg., and approximately 100,000 gal. of kerosene in tank cars, 110 deg., for the period ending June 30, 1922, all bids to be in before noon of January 3, 1922.

THE NEW YORK CENTRAL will receive bids until 12 o'clock noon, January 10, 1922, for its requirements from January 1, to March 31, 1922, of black, galvanized and blue annealed sheets; driving and truck tires for locomotive service, seamless steel tubes for repairs to locomotive and stationery boilers; wire nails and staples; steel bars, steel shapes and steel plates; steel billets; axies for car and locomotive repairs; and its present requirements of crossing frogs; special frogs; special crossing; spring rail frogs; switch covers; rigid crossing; common moveable points; offset splices; rigid manganese frogs; crank stands for double slip, and new metal super-structure for one span complete for one track on bridge No. 22, Western division.

Supply Trade News

David E. Hamilton has been appointed resident representative in New York City of **Herbert Morris, Inc.,** Buffalo, N. Y.

The **Keller Pneumatic Tool Company,** Grand Haven, Mich., recently changed its corporate name to **William H. Keller, Inc.**

The **Cutler-Hammer Manufacturing Company,** Milwaukee, Wis., has removed its Boston, Mass., office from the Columbian Life building, to rooms 403 and 404 Harvey building, Chancy street. C. W. Yerger is manager of this office.

E. R. Mason has been appointed eastern and export representative of **Brown & Co., Inc.**—Wayne Iron & Steel Works, Pittsburgh, Pa. Mr. Mason's headquarters are at the New York City offices of Brown & Co., Inc., room 2038 Grand Central Terminal.

R. C. Campbell, formerly vice-president of the Duncan Lumber Company, has been appointed manager of the car and railroad material department of the **Burton-Beebe Lumber Company,** Seattle, Wash., with headquarters at Chicago. Mr. Campbell will also handle long leaf yellow pine for J. H. Burton & Co., Inc., of New York and Mobile, Ala. The Burton-Beebe Lumber Company has moved its Chicago office from 53 West Jackson Boulevard to the Lumber Exchange building.

The **Texas Company,** New York City, has consolidated its traffic and railway sales departments into one department known as the railway traffic and sales department. The headquarters of **G. L. Noble,** vice-president; **Wm. Jervis,** manager, and **W. E. Greenwood,** assistant manager, is at 17 Battery Place, New York City, which will also be the headquarters of **J. E. Symons,** superintendent of the lubricating division of the department. **W. H. Barrows** has been appointed district manager at Houston, Texas.

Obituary

William J. Armstrong, assistant treasurer of the Gould Coupler Company, New York City, died suddenly on December 25, at his home in Brooklyn. Mr. Armstrong had been in the service of the Gould Company for the past 25 years.

Thomas Murray, assistant secretary and assistant treasurer of the United States Steel Corporation, at New York, died on December 27, at his home in Sparkill, N. Y. Mr. Murray was also a director of the corporation and of a number of its subsidiaries. He was born in Jersey City, N. J., on December 14, 1867. In May, 1894, he became connected with the Federal Steel Company, and was appointed assistant secretary of the United States Steel Corporation upon its organization in April, 1901. On November 11, 1919, he was appointed also assistant treasurer of the corporation.

Orville C. Mann, inventor of several railroad appliances, died at Oak Park, Ill., on December 15. Mr. Mann was born at Bath, N. H., on July 22, 1859, and entered railway service with the Chicago, Milwaukee & St. Paul in 1878. In 1901, after serving on the Iowa and Dakota divisions of the above road, he moved to Chicago, where he entered the supply trade business as a manufacturer of smoke jacks. He later became associated with E. McCann, superintendent of bridges and buildings of the Atchison, Topeka & Santa Fe, who had perfected a spreader. Later Mr. Mann took over the entire interests in this device, which he has promoted in recent years.

Of the Total of 1,739 passenger cars owned by the Pacific system of the Southern Pacific, 890 are all-steel, 812 are wood and 37 are of steel underframe construction. The first steel coach, built as an experiment, was completed in the Sacramento shops of the company in 1906, and no wooden passenger cars have been built by the company since 1910.

Railway Construction

Benton & Saline County.—This company has been chartered to construct a railroad line from Benton, Ark., extending beyond Glenville Park along the Saline river, a distance of about three miles.

Canadian Pacific.—This company is preparing plans and estimates for the construction of a new freight shed and team tracks at Windsor, Ont.

Gilmore & Pittsburgh.—This company contemplates the construction of a line of railroad between Whitehall, Mont., and Dillon, using the tracks of the Oregon Short Line from Dillon to Armstead, Mont., where the present terminus of the road is located.

Gulf, Colorado & Santa Fe.—This company will construct a two-story brick station at Brenham, Tex., to cost approximately $40,000.

Illinois Central.—This company will receive bids until January 4, for the construction of a frame passenger and freight station, 96 ft. by 24 ft., at Belmont, Miss.

Missouri, Kansas & Texas.—This company contemplates the construction of a roundhouse, power plant, locomotive shop, transfer sheds, oil storage tanks and warehouses at Denison, Tex., estimated to cost more than $3,000,000.

Missouri Pacific.—This company has awarded a contract to T. S. Leake & Co., Chicago, for the construction of a 25-ft. extension to its roundhouse at Hoisington, Kan.

Missouri Pacific.—This company will accept bids until January 9 for the construction of a frame freight and passenger station at Zeigler, Ill. Bids also will be accepted until the same date for remodeling a brick roundhouse at Coffeyville, Kans.

New York City.—The municipal government, which has been ordered by the state legislature to construct a railway tunnel under the Narrows from Staten Island to Brooklyn for freight and passenger traffic, as has been previously noted in these columns, has now prepared a proposal to present to the legislature looking toward the furtherance of the project. The city's proposal calls for authority to acquire all railway lines on Staten Island, including the Baltimore & Ohio's subsidiary, the Staten Island Rapid Transit—by condemnation proceedings if necessary. An additional marginal railway on Staten Island is also provided for. The city's plan was promulgated without consultation with the Transit Commission or port authority and the ideas of these two bodies are at variance with those of the city government. The project is one to provide through freight connection between Long Island and the carriers terminating in New Jersey, as well as rapid transit facilities for one of the city's boroughs now dependent entirely upon ferryboat transportation. The necessary expenditure will approximate $225,000,000.

Osage Railway Company.—This company, which was noted in the *Railway Age* of December 3 (page 1121), as applying to the Interstate Commerce Commission for permission to construct approximately 11 miles of railroad, extending from Foraker, Okla., to the Osage County oil field in that state, has received official sanction, and has awarded a contract for the grading of the new road to R. L. Plunkett, Pawhuska, Okla., and a contract for the construction of the bridges, trestles and culverts to J. A. Moore, Foraker.

Southern Pacific.—This company has been requested by the Board of State Harbor Commissioners of California to remove its trestle across Channel street, just east of the intersection of Seventh street, San Francisco, Cal., and substitute in the place of the trestle a drawbridge or other like facility. The harbor commission claims that the present trestle prevents full and complete use of the street for commerce and navigation. The matter is now before the State Railroad Commission.

Thomas Gravel Company.—This company contemplates the construction of a six-mile railroad line at Alexandria, La.

Railway Financial News

ATLANTA, BIRMINGHAM & ATLANTIC RAILWAY.—*Bondholders' Committee for A. & B. First Mortgage Bonds.*—Default having been made on the July 1, 1921, interest on the outstanding $4,090,000 first mortgage five per cent 30-year gold coupon bonds of the Atlantic & Birmingham Railway, the committee named below has been formed to protect their interests. Holders are requested to deposit their bonds with the Old Colony Trust Company, Boston, or with the Farmers' Loan & Trust Company, New York depositaries. The committee consists of: Francis R. Hart, chairman; James H. Perkins, Percy R. Payne, 2d.; George Bramwell Baker, Walter F. Wyeth, secretary, 17 Court street, Boston, and Pillsbury, Dana & Young, 53 State street, Boston, counsel.

ALABAMA GREAT SOUTHERN.—*Authorized to Procure Authentication of Bonds.*—This company has been authorized by the Interstate Commerce Commission to procure the authentication and delivery to its treasurer of $1,232,000 of first consolidated mortgage 5 per cent gold bonds, to be held in the treasury.

CHICAGO & EASTERN ILLINOIS.—*Order Amended.*—The Interstate Commerce Commission has made certain modifications of its order authorizing the issue of securities in connection with the reorganization and has extended the time within which the securities may be issued from January 1 to February 28.

CLEVELAND, CINCINNATI, CHICAGO & ST. LOUIS.—*Protective Committee for Preferred Stock.*—A protective committee composed of Edwin G. Merrill, president, New York Life Insurance & Trust Company; George E. Roosevelt and Willis D. Wood has announced to the holders of preferred stock that they consider the offer of the New York Central Railroad to purchase the stock in exchange for equal amounts of New York Central stock inadequate. The committee believes that if the holders act together it will be possible to obtain substantial recognition of the stock's intrinsic value. Holders of preferred stock who are willing to be represented by the committee are requested to communicate promptly with the secretary of the committee, Charles Eldridge, 52 Wall street.

See also New York Central below.

CHICAGO, INDIANAPOLIS & LOUISVILLE.—*Authorized to Issue Bonds.*—This company has been authorized by the Interstate Commerce Commission to issue $3,493,000 of first and general mortgage gold bonds, series B, in exchange for an equal amount of 5 per cent gold bonds, series A; $3,000,000 to be sold at not less than 90 and the balance to be pledged as security for short term notes.

FORT SMITH & WESTERN.—*Authorized to Issue Securities.*—This company, recently organized as the Ft. Smith & Western Railway, has been authorized by the Interstate Commerce Commission to issue 62,400 shares of common stock without par value, $1,500,000 of first mortgage bonds and $3,744,000 of second mortgage bonds to be exchanged for first mortgage bonds of the Ft. Smith & Western Railroad and to use the last mentioned bonds for the purpose of acquiring at a foreclosure sale the property of the old company.

GREAT NORTHERN.—*Common Officers and Directors Authorized.*—The Interstate Commerce Commission has issued an order authorizing officers and directors of this company to retain their offices while also retaining positions with subsidiary and affiliated companies.

NEW YORK CENTRAL.—*Asks Authority to Lease Roads.*—The Cleveland, Cincinnati, Chicago & St. Louis has filed an application with the Interstate Commerce Commission for authority to acquire the balance of the stock and some bonds of the Peoria & Eastern; and the New York Central, the Toledo & Ohio Central, and the Kanawha & Michigan have applied for authority to enter into leases by which the properties of the Zanesville & Western, Kanawha & Michigan, Kanawha & West Virginia, and Toledo & Ohio Central will be held by the New York Central under lease.

The stockholders, at a special session to follow their annual meeting in Albany, N. Y., on January 27, will be asked to approve the proposals of the directors to lease the Toledo & Ohio Central and the above-mentioned railroads.

PITTSBURGH, CINCINNATI, CHICAGO & ST. LOUIS.—*Dividend Passed.*—The directors have decided that, in view of the financial results for the past year, no dividend would be declared. On June 22, last, the directors postponed action on the 2 per cent semi-annual dividend which had been previously paid.

All of the Panhandle stock except about 1 per cent is now owned by the Pennsylvania Company.

RIO GRANDE SOUTHERN.—*Not to Pay Interest.*—The directors have announced that the interest due January 1 on the first mortgage bonds would not be paid because of inability to meet it.

ROCK ISLAND SOUTHERN.—*Returned to Owners.*—After 22 months' litigation, the United States District Court at Peoria, Ill., on December 23, ordered that the Rock Island Southern be returned to its owners. The road passed into receivership on March 17, 1920, following a complaint heard by the Interstate Commerce Commission.

ST. LOUIS-SAN FRANCISCO.—*Authorized to Issue Bonds.*—The Interstate Commerce Commission has authorized an issue of $2,122,000 of prior lien mortgage bonds to be pledged and repledged from time to time as collateral security for short term notes.

WESTERN MARYLAND.—*Annual Report.*—See article on another page of this issue entitled "Western Maryland, 1921 Net in Sharp Contrast."

WICHITA FALLS, RANGER & FORT WORTH.—*Receivership Is Asked.*—J. W. Meany has made application in the United States Northern District Court of Texas for the appointment of a receiver for this railway. His claim is for more than $100,000 in connection with the construction of the line, which extends between Dublin, Tex., and Breckenridge, 67 miles.

Railroad Administration Settlements

The United States Railroad Administration reports the following final settlements, and has paid out to the several roads the following amounts:

Colorado & Southern	$1,775,000
Ft. Worth & Denver City	725,000
Copper Range	130,000
Evansville & Indianapolis	235,000
Chicago, Terre Haute & Southeastern	35,000
North Charleston Terminal Co.	20,020.87
Atlantic & Yadkin	120,000
Yadkin	115,000
SHORT LINE RAILROADS	
Lawndale Railway & Industrial Co.	800

The payment of these claims on final settlement is largely made up of balance of compensation due, but includes all other disputed items as between the railroad companies and the administration during the 26 months of federal control.

Dividends Declared

Central of New Jersey.—Special, 2 per cent, payable December 31 to holders of record December 30.

Elmira & Williamsport.—3.26 per cent, payable January 3 to holders of record December 20.

Kansas City Southern.—Preferred, 1 per cent, quarterly, payable January 16 to holders of record December 31.

Mobile & Ohio.—4 per cent, payable December 31 to holders of record December 23.

New London Northern.—2¾ per cent, quarterly, payable January 2 to holders of record December 16.

Norfolk & Western.—Preferred, 1 per cent, quarterly, payable February 18 to holders of record January 31.

Northern Railroad of New Hampshire.—1½ per cent, quarterly, payable January 3 to holders of record December 12.

Norwich & Worcester.—Preferred, 2 per cent, quarterly, payable January 2 to holders of record December 15.

Old Colony.—1¾ per cent, quarterly, payable January 2 to holders of record December 10.

Philadelphia & Trenton.—2½ per cent, quarterly, payable January 10 to holders of record December 31.

Providence & Worcester.—2½ per cent, quarterly, payable December 31 to holders of record December 14.

Reading Company.—Common, 2 per cent, quarterly, payable February 9 to holders of record January 17; second preferred, 1 per cent, quarterly, payable January 12 to holders of record December 30.

Richmond, Fredericksburg & Potomac.—Common stock and dividend obligations.—4½ per cent, payable December 31 to holders of record December 24.

Rome & Clinton.—2¾ per cent, payable January 1 to holders of record December 22.

Troy Union.—6 per cent, payable January 16 to holders of record December 30.

Railway Officers

Financial, Legal and Accounting

Hugh Clement has been appointed assistant treasurer of the Virginian with headquarters at Norfolk, Virginia, to succeed F. W. Russell, resigned to engage in other business.

Operating

C. N. Clark has been appointed superintendent of the Montour with headquarters at Coraopolis, Pa., effective January 1. The position of assistant superintendent has been abolished.

A. G. Whittington, formerly general manager of the International & Great Northern, with headquarters at Palestine, Tex., has been appointed general superintendent of the Trinity & Brazos Valley, with headquarters at Teague, Tex.

John H. McKay, division superintendent of the Texas & Pacific, with headquarters at Marshall, Tex., will, in addition to his present duties, assume charge of the Louisiana division, with jurisdiction over the line extending from Marshall, Tex., to New Orleans, La., succeeding W. H. DeFrance, superintendent of that division, who has resigned.

Traffic

A. L. Burnet, city freight agent of the Louisville & Nashville with headquarters at Atlanta, Ga., has been promoted to commercial agent with headquarters at Macon, Ga., succeeding J. C. Willis, transferred.

W. E. Renneker has been appointed assistant general freight agent of the Atlantic Coast Line, with headquarters at Rocky Mount, N. C. **W. C. Ragin** has been appointed to a similar position at Wilmington, N. C. and **Hansford Sams** to a similar position at Savannah, Ga.

E. S. LeGette has been appointed general agent of the Atlantic Coast Line, with headquarters at Atlanta, Ga. **P. J. Lee** has been appointed commercial agent with headquarters at Nashville, Tenn. **W. G. Dixon** has been appointed commercial agent with headquarters at New York.

T. A. Matthews, division freight agent of the Chicago, Rock Island & Pacific with headquarters at Minneapolis, Minn., has been promoted to assistant general freight agent with the same headquarters. **D. O. Leary,** division freight agent with headquarters at Ft. Worth, Tex., has been promoted to general agent with headquarters at San Antonio, Tex. He will be succeeded by A. L. Talkington, freight agent at North Ft. Worth. **F. H. Faus,** division freight agent with headquarters at Colorado Springs, Col., has been promoted to general agent with the same headquarters. These appointments are effective January 1.

Mechanical

Roy Skidmore, erecting foreman of the Kansas City Southern, with headquarters at Pittsburg, Kan., has been promoted to shop superintendent with the same headquarters, succeeding **Charles E. Oakes,** deceased.

J. C. Rae, general foreman of the Ann Arbor, with headquarters at Owosso, Mich., has been appointed acting master mechanic, with the same headquarters, assuming charge of the mechanical department, which action was necessitated by the resignation of **J. E. Osmer,** superintendent of motive power and the car department.

Purchasing and Stores

I. S. Fairchild has been appointed storekeeper of the New Orleans Terminal division of the Illinois Central with headquarters at New Orleans, La.

F. G. Prest, whose appointment as director of purchases of the Northern Pacific, with headquarters at St. Paul, Minn., was announced in the *Railway Age* of November 26 (page 1072), was born on a farm near Queenston, Ont., on January 5, 1854. He entered railroad service on August 1, 1880, as a clerk in the purchasing department of the Northern Pacific at St. Paul. One year later he was appointed chief clerk of that department, which position he held until 1891, when he was promoted to assistant purchasing agent, with headquarters at St. Paul. In 1896 he was promoted to purchasing agent with the same headquarters and continued in that capacity until his promotion.

F. G. Prest

Obituary

John J. Byrne, assistant passenger traffic manager of the Atchison, Topeka & Santa Fe, with headquarters at Los Angeles, Cal., died suddenly from heart disease on December 26, at his home in that city. Mr. Byrne was born on January 16, 1859, at Hamilton, Ont. He entered railroad service on April 16, 1873, as a clerk in the auditor's office of the Great Western (Grand Trunk), at Hamilton, since which time he has been consecutively, clerk in the general passenger agent's office of the Chicago & Alton, at Chicago, from December 19, 1877, to October 14, 1880; rate clerk in the general passenger department of the St. Louis, Iron Mountain & Southern (Missouri Pacific), from October 15, 1880, to October 15, 1881; rate clerk in the general passenger departments of the Missouri Pacific and the Michigan Central, respectively, from the latter date until March, 1883, during which period he became chief rate clerk in the passenger department of the latter company; from March, 1883, to March 31, 1885, he was secretary of the Chicago Railroad Association; from April 1, 1885, to July 1, 1887, he was general passenger and ticket agent of the Oregon Railway & Navigation Company; from August 1, 1887, to December 1, of the same year, he was passenger agent of the Atlantic & Pacific (Atchison, Topeka & Santa Fe), at San Francisco; from December 1, 1887, to September, 1888, he was chief clerk in the passenger department of the Chicago, Santa Fe & California (Atchison, Topeka & Santa Fe), at Chicago; from September, 1888, to December 31, 1889, he was assistant general passenger agent for the same road, working in the same capacity after its amalgamation with the Atchison, Topeka & Santa Fe, until January 1, 1892. He was promoted to assistant passenger traffic manager on January 1, 1892, which position he held until January 31, 1895, when he was made general passenger agent of the Atchison, Topeka & Santa Fe, lines west of Albuquerque, N. M. On October 10, 1905, he again became assistant passenger traffic manager.

J. J. Byrne

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Railway Age

Vol. 71 December 31, 1921 No. 27

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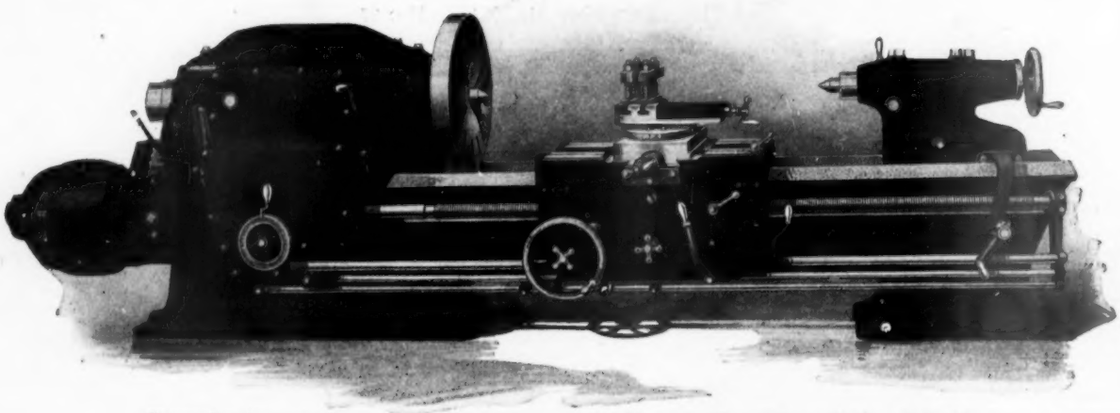

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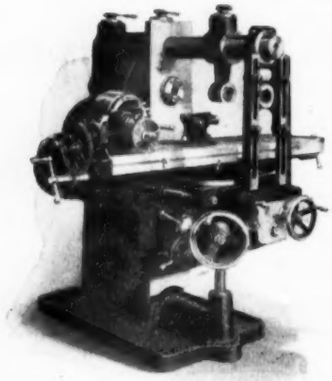
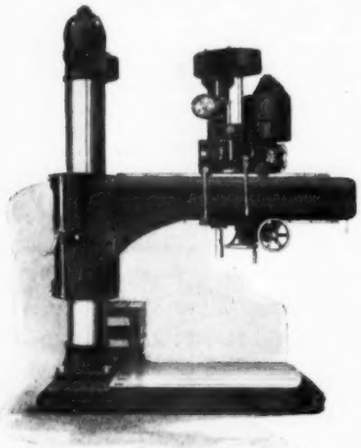


No. 2 Universal Milling Machine



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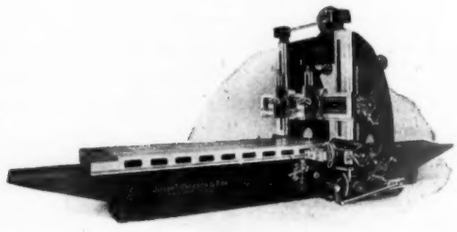

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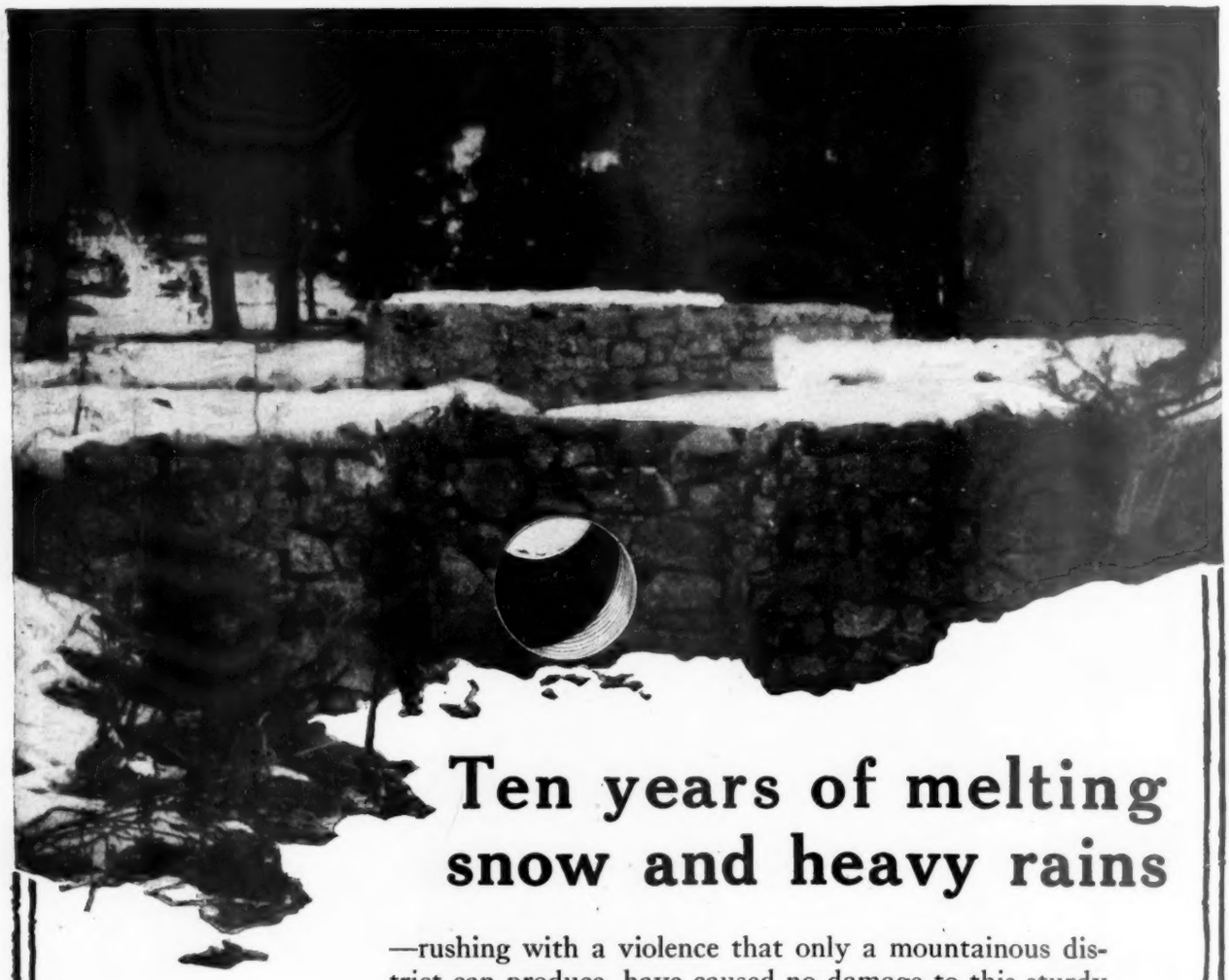


Ten years of melting snow and heavy rains

—rushing with a violence that only a mountainous district can produce, have caused no damage to this sturdy 48-inch Armco Culvert. Year after year, in all parts of the country, hundreds of Armco Culverts, subjected to the deteriorating action of all kinds of soil and climate, are duplicating this record of service.

If only one Armco Culvert had given so many years of service, their enduring qualities might be questioned, but when thousands of them show not the slightest sign of deterioration after ten or more years of service, the rust-resisting and enduring qualities of Armco Ingot Iron are proven beyond the shadow of a doubt.

The increasing use of Armco Culverts by experienced engineers and Highway Commissioners is authentic approval of their ease of installation and enduring qualities.

TRADE MARK ARMCO Resists Rust Ingot Iron

There is a manufacturer in nearly every state, and in Canada, making genuine rust-resisting ARMCO CULVERTS and other products of Armco Ingot Iron such as flumes, siphons, tanks, road signs, roofing, etc. Write for full information and nearest shipping point on products in which you are interested.

ARMCO CULVERT & FLUME MFRS. ASSN.

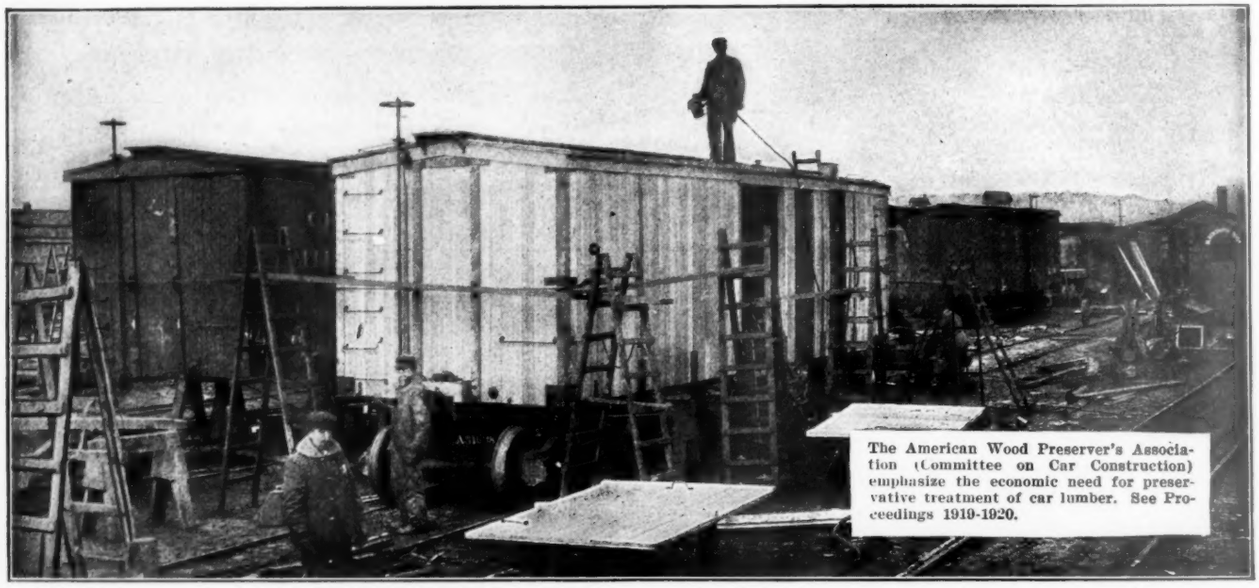
215 NORTH MICHIGAN AVE. CHICAGO

Insurance and Protection

Insurance is one thing—protection another. A man may be insured for ten thousand dollars but he is not protected without a body-guard.

The best travel insurance available does not protect a man when he is in one train that happens to be hit by another. It may protect his family but money gives little satisfaction when it is received as payment for human life.

The Miller Train Control
does more than insure
It protects!



The American Wood Preserver's Association (Committee on Car Construction) emphasize the economic need for preservative treatment of car lumber. See Proceedings 1919-1920.

Some shops brush-treat contact points of sills with products ranging from glue and asphalt to ordinary paint. This is bad as it creates a false sense of security. A wood preservative must be sufficiently toxic (poisonous) to kill wood-destroying organisms (fungous growths) and inhibit their development

Carbosota Will Not Taint Lading

The first step in applying wood preservation to car construction is the protection against decay of the points of contact.

Surface treatment with Carbosota Liquid Creosote Oil, applied by brushing or spraying, is *the one* method that can immediately be employed *in every car shop and repair yard*. The objection is sometimes made that the surface treatment of sills may taint the lading. However, this is unfounded. Wherever preservative treatments have been properly applied, results have been universally satisfactory, and in no case have contents of cars or lading been damaged. Evidence in support of this statement is readily available.

Carbosota Liquid Creosote Oil, because of its superior physical characteristics, is undoubtedly most suitable for this sort of work. When requisitioned by its trade-mark—"Carbosota"—absolute uniformity is assured, no matter from where obtained. Carbosota is liquid at 41 deg. F. (5 deg. C)—a most important feature particularly when applied in Surface treatments.

Further information about Carbosota may be obtained by addressing our nearest office.

Barrett
Carbosota
Liquid Creosote Oil
For Preserving Wood

(Green wood cannot be effectively creosoted by non-pressure processes. It should be seasoned. All framing, drilling of bolt holes, etc., should be done before treatment. If this is impossible, two brush coats of Carbosota should be applied to all untreated surfaces exposed by subsequent cutting or drilling.)

The Barrett Company

New York	Chicago	Philadelphia	Boston	St. Louis
Cleveland	Cincinnati	Pittsburgh	Detroit	New Orleans
Birmingham	Kansas City	Minneapolis	Dallas	Nashville
Salt Lake City	Seattle	Peoria	Atlanta	Duluth
Milwaukee	Bangor	Washington	Johnstown	Syracuse
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THE BARRETT COMPANY, Limited: Montreal Toronto Winnipeg
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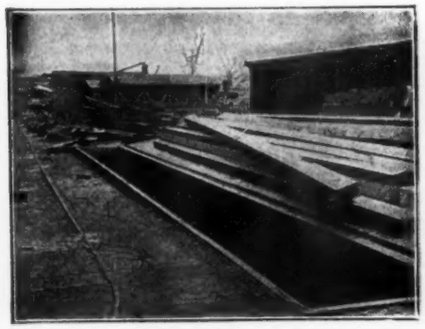

Carbosoting (creosoting) car sills by the Open Tank process (hot and cooling treatment).

Brush treating mortise of timber which was framed after creosoting

Decayed intermediate sills and flooring

At left of illustration—Clipping from Providence, R. I. Journal, August 11, 1921. The Judge did not issue a Restraining Order. Evidently the Riveting Foreman told him that with Boyers the noise would cease in less time than with any other riveting hammer built. Illustration *at right* — Biltmore Hotel, Providence, R. I., built by The Thompson-Starrett Company, with the aid of Boyer Riveting Hammers.

At left —
Boyer No. 80 Riveting Hammer.

BILTMORE RIVETERS QUIET, COURT BACK IN OLD ROOM

Noise of "Guns" and Buckers-Up Forced Judge to Move.

Although to disturb a session of the Municipal Court is generally a serious offence, the disturbance that forced Judge Stone to quit the convenient courtroom on the top floor of the City Hall a while ago and hold sessions in the council chamber on the second floor, was not considered contempt of court, and the offenders were not haled before His Honor to be reprimanded.

Anyway, it's all over now, and the daily grist of records is dispensed as of old. The riveters working on the lower part of the Hotel Biltmore have practically ceased the punctuating the proceedings with the rattle of pneumatic guns, and the plaintive plaint of the "buckerup" as he held his hammer against the red-hot rivet, is heard no more. That is, not so much as it was.

Then again, laying a new cement floor in the courtroom was not a help to the proceedings; hence the temporary change of quarters.

Now that the enterprising riveter isn't riveting quite so much and the cement layer not pursuing his splashy occupation the court has moved back into its regular quarters. Judge Stone says he never could get used to the seats in the council chamber.

All Plant Managers Contractors and Engineers } *Greetings—*

NOTICE is hereby given that the Boyer Riveting Hammers used in erecting this hotel did more than merely make a noise—they drove perfect rivets in record time, as do all Boyers. Boyers drive from *seven to ten rivets per minute*—depending upon rivet size.

Not only on this important job, but on all exacting riveting operations—where *speed, perfect rivets, air* and *maintenance economy* are essential—Boyers are usually standard.

Good tools + contented workmen = efficient work at a minimum cost per rivet driven. A Boyer pays for itself every twenty to thirty days. Then why figure or experiment further? Your final choice will be: Boyers + more Boyers. Ask for Bulletin 810.

Chicago Pneumatic Tool Company

Chicago Pneumatic Building · 6 East 44th Street · New York

Sales and Service Branches all over the World

P-140

BOYER PNEUMATIC HAMMERS··LITTLE GIANT PNEUMATIC AND ELECTRIC TOOLS
CHICAGO PNEUMATIC AIR COMPRESSORS··VACUUM PUMPS··PNEUMATIC HOISTS
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BOYER *The world's standard* CHICAGO PNEUMATIC **HAMMERS** *wherever rivets are driven*

Your Urgent Need is To Eliminate Waste

Material Handling Cyclopedia

Ready for Timely Service

LACK of adequate facilities in your terminals, warehouses and at transfer points as the present and future cause of congestion on your lines can be largely overcome by the right selection of efficient mechanical handling devices and methods. It is a case of knowing what machines are available, how they operate and where to buy them. This information and a knowledge of the application of the various machines themselves is now and will be the premier need. Exactly these things comprise the contents of 1921 Material Handling Cyclopedia.

Success in these times depends upon eliminating waste, cutting costs, multiplying man-power and conserving time and labor by the use of modern mechanical handling machinery. There's no comparison between antiquated tools and later inventions. *Be certain.* Consult the Cyclopedia and make sure that you are using the latest equipment and applied knowledge.

Cranes, hoists, winches, derricks, excavators, buckets, steam shovels, scoops, magnets, car load and unloading machinery, tiering machines, industrial trucks, tractors and trailers—these are but a few of the devices described and illustrated in the 1921 MATERIAL HANDLING CYCLOPEDIA. It is the first book of its kind published.

A Single Purpose

A single purpose has guided us—**to produce in one volume a book that gives the user the material handling information he needs most in an easily accessible form.**

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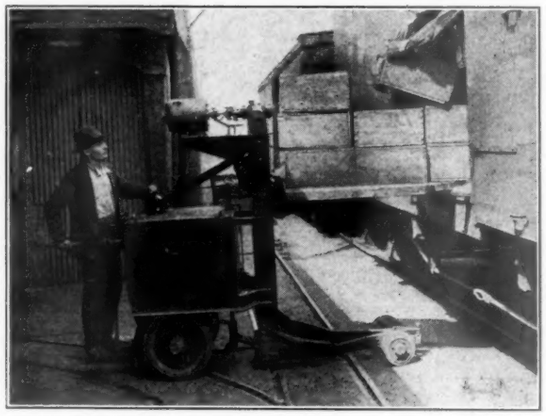

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Terse, clear-cut definitions of the principal terms used in connection with material handling methods and equipment and unusually full and complete descriptions of the mechanisms of the various devices are given.

Technical Section—550 Pages

Principal types of material handling machines are taken up under classified headings. Transferation principles are discussed at length showing the advantages of the various types of machines for specific lines of work. Carefully chosen photographs, together with line drawings, charts, curves, etc. render the text easily understood.

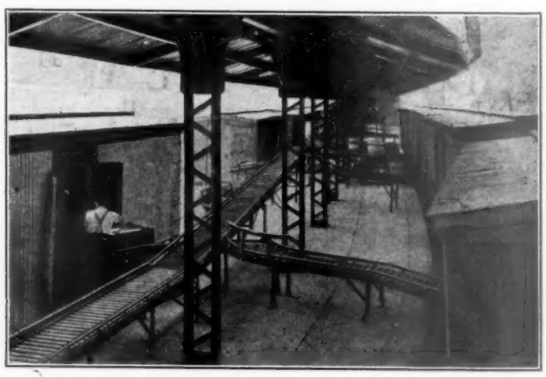
Catalog Section—150 Pages

Enlarges and completes the other two sections. Leading manufacturers illustrate and describe their own products pointing out the particular advantages of their devices for certain branches of industrial service. These pages are grouped according to the nature of service the devices perform. All three sections are cross referenced so that you can find any information you need in a moment.

Important Features

A *Directory of Products,* a *Trade Name Index* and an *Alphabetical Index of Manufacturers* are included for ready reference.

You can have this cyclopedia on your desk, ready to serve you, promptly. Just make out your check for $10.00, if you like a durable Buckram binding or $15.00 if you prefer Full Leather. **Hand it with the coupon to your secretary.**



CAMBRIA STEEL CARS

for freight service

ALL of the rolled and forged parts entering into the construction of steel gondola, tank, hopper and other types of cars in the Cambria Car Shops are made by us.

These include:—

Structural Shapes **Plates**
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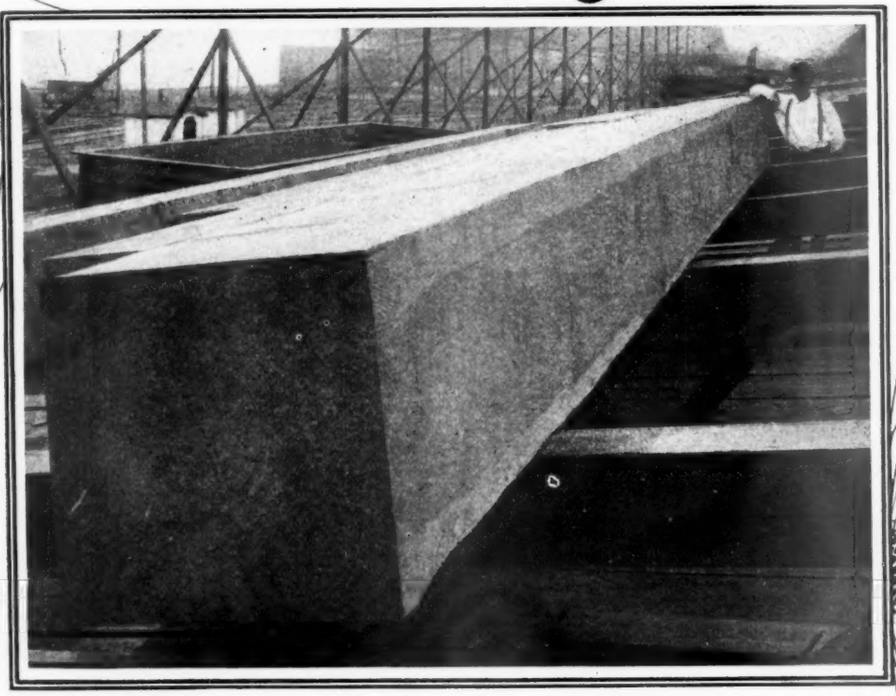
SOLE EXPORTER OF OUR COMMERCIAL PRODUCTS CONSTECO CONSOLIDATED STEEL CORPORATION 25 BROADWAY, NEW YORK, U.S.A.

Better Southern Pine

was never cut than we are cutting now



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IN construction that puts unusual strain and wear upon the materials used, Southern Pine lumber and timbers have been *standard* among careful builders for a century.

The nine great mills, which supply the products marketed by Exchange Sawmills Sales Company, never milled better Southern Pine than they are cutting now. To splendid virgin timber, these mills add a thoroughly modern manufacturing process and insist above all upon adhering to the strictest grading rules. This accounts for the outstanding uniformity of lumber and timbers from our sales offices.

LONG and SHORT LEAF SOUTHERN PINE

Yard and Shed Stock and Heavy Structural Materials

Lumber Products EXCHANGE SAWMILLS SALES COMPANY Kansas City, U.S.A.

For Railroads—
Bridge and Trestle Timbers, Flooring, Roofing, Siding, Lining, Sills, Framing, Sawn Ties. We make a specialty of bridge stringers.

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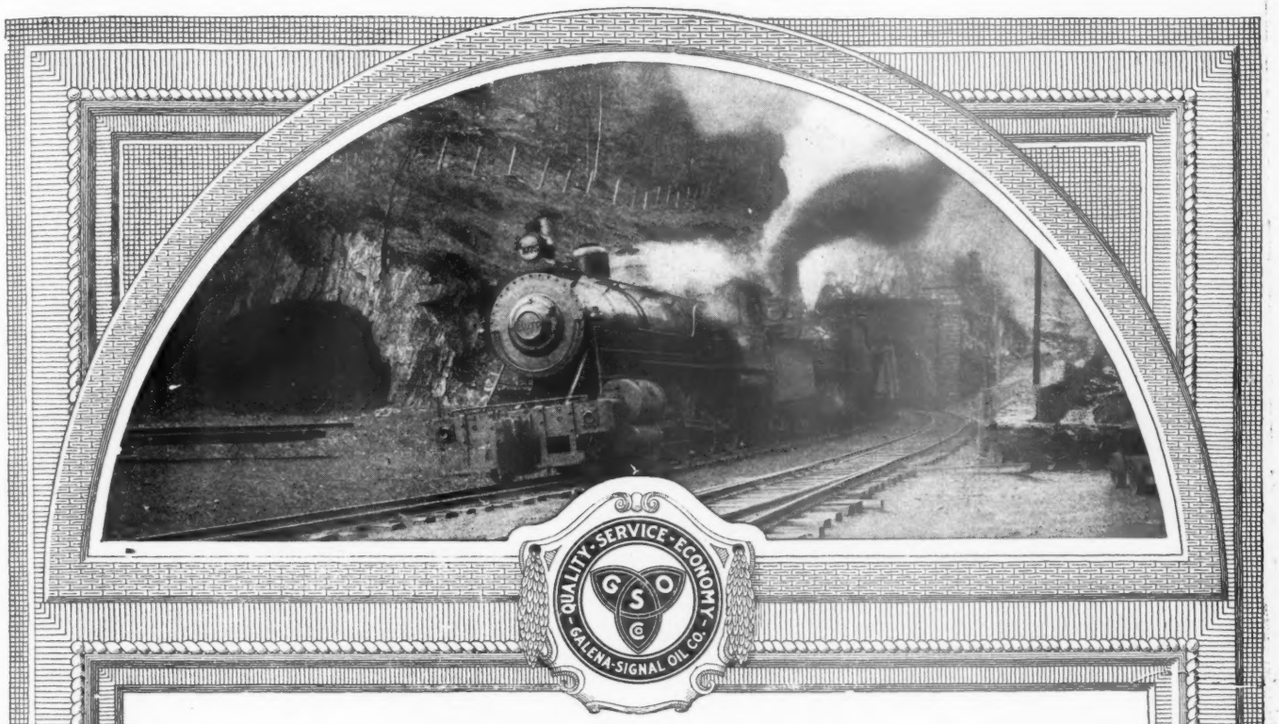


Everyday performance is the guarantor of Galena Oil economy.

On hundreds of railroads—east, west, north and south, under their widely varying conditions of climate, grade and equipment—Galena Oils are delivering a lubrication service never equalled in efficiency or economy.

Characterized by quality and uniformity, these justly celebrated products have become the standard for railroad lubrication the world over.

The trite saying "Figures don't lie" is nevertheless a true one when applied to railroad cost records, and they are the kind of figures that testify with indisputable authority to the ability of Galena Oils to give greatest mileage, and reduce repairs and replacements of bearing parts to a minimum.

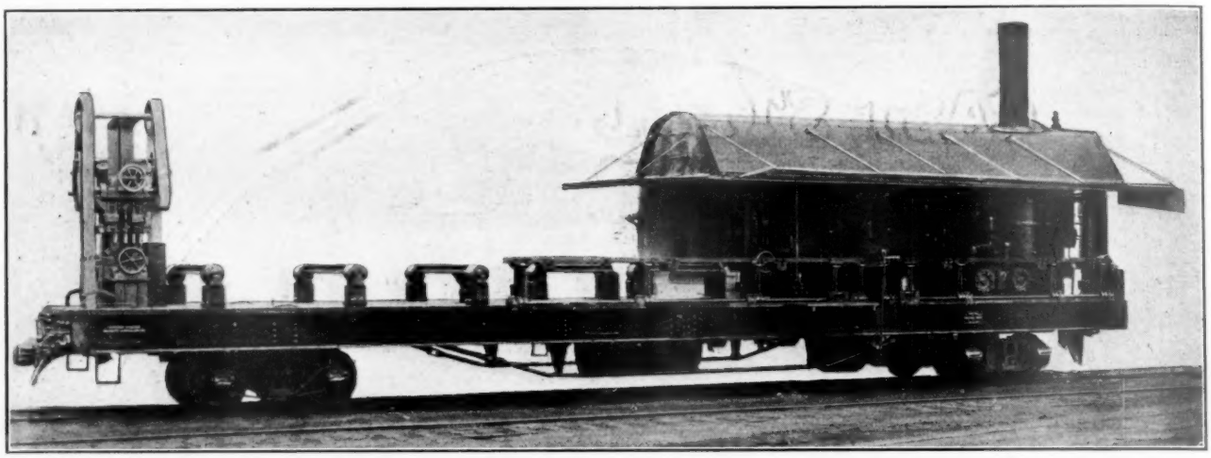
These economic advantages are supplemented by a feeling of security and satisfaction in the operation of Galena Service that is beyond price.

"When Galena Service Goes In—
Lubrication Troubles Go Out!"

Galena-Signal Oil Company

New York - Franklin, Pa. - Chicago

and offices in principal cities



PORTABLE RAIL SAW

If handicapped by the slowness of adequate appropriations, the success and economy of rail sawing experienced by the many roads using "INDUSTRIAL" Portable Rail Saws presents a solution to the present day needs of placing the roadways in good condition.

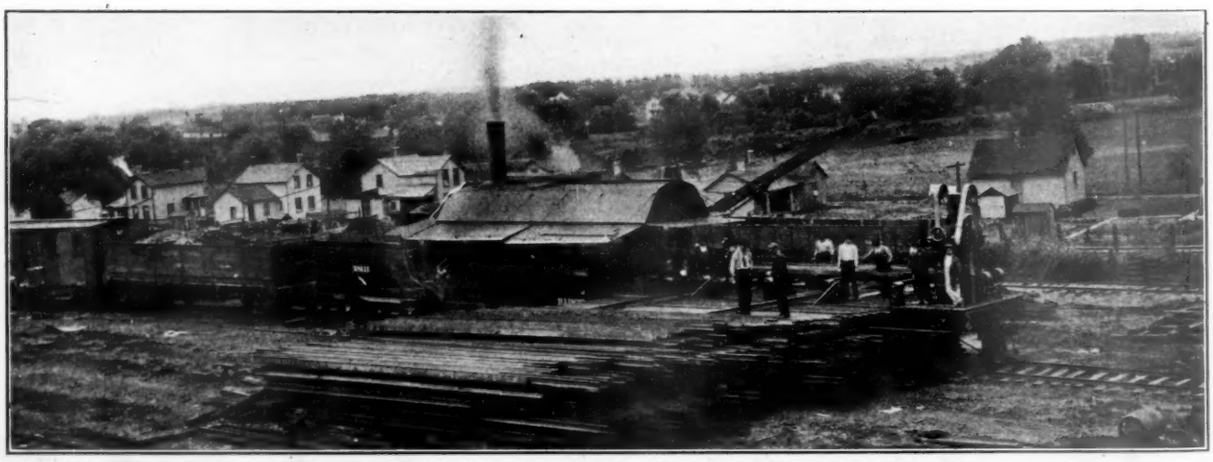
An "INDUSTRIAL" Portable Rail Saw is a big factor in reducing the cost of railway extension and maintenance. It eliminates the long hauls of rails required by the stationary plant.

The "INDUSTRIAL" Portable Rail Saw comprises a complete and very efficient plant for sawing off the worn ends of rails and redrilling them preparatory to relaying. The plant develops a capacity of 500 rails or more per day and rails up to and including 100 pounds per yard may be handled with the standard machine.

After calipering and matching the ends of re-sawed rails engineers state that the re-sawed rails make as smooth a track as new rails from the rolling mills.

We will gladly supply you with further information regarding "Industrial" Portable Rail Saws.

WRITE TODAY!



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Locomotive, Erection and Wrecking Cranes, 5 to 160 tons capacity. Pile Drivers, Pillar Cranes, Transfer Cranes, Rail Saws, Grab Buckets, Crawling Tractor Cranes

ECONOMY CAST STEEL DRAFT ARMS

A typical application of Economy Cast Steel Draft Arms

Economy Cast Steel Draft Arm is an economical and efficient device for strengthening wooden and light steel underframe cars so that they are fit for service in heavy trains. Economy Arms can be designed to accommodate any style of draft gear.

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~GENERAL AMERICAN~

The Only Big Refrigerator Inquiry of the Year 1921

Five hundred of these forty-ton, forty-foot, refrigerators are now being delivered on schedule to the Great Northern by The General American Car Company.

The thousands of "GA" cars of standard type in service today—refrigerator, gondola, stock, box, flat, grain, automobile, furniture and hopper-bottom, as well as specialty constructions for industrial and inter-plant uses, bearing the names and trade-marks of big railroads and manufacturing concerns, testify to the pre-eminence of "GA" equipment.

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General Offices: Harris Trust Building, Chicago
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Pressed Steel Shapes *Forgings* *Gray Iron Castings* *Brass Castings*

RAILWAY CARS~EVERY TYPE

The NATIONAL Coiled Spring JOURNAL BOX

Keeps the dust outside
Keeps the oil inside

THE NATIONAL MALLEABLE CASTINGS COMPANY

CLEVELAND CHICAGO INDIANAPOLIS TOLEDO
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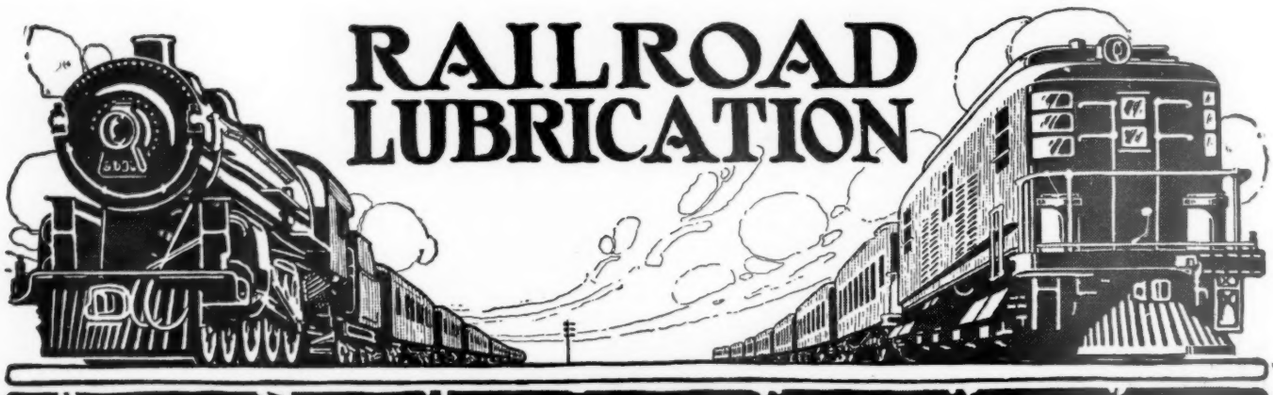

RAILROAD LUBRICATION

Bulletin No. 188

Engineers:

As information, will advise that *the *oil issued engines NOW* for lubrication purposes will be oil of better quality and higher flash.

The valve oil issued to all engines is a high grade superheat oil instead of the valve oil *FORMERLY* used. This oil has a very heavy body and only runs about one-half as many drops to the pint as the former oil. The engine oil also is of a heavy body and will cling to the surface better than the old oil.

By careful handling of the new oils you should be able to note a marked improvement, and the necessity of excess oil tickets is removed.

We want the cooperation of all in our efforts to give you a good oil that will answer every purpose and hold our lubricating costs within reasonable bounds.

MASTER MECHANIC

***TEXACO RAILROAD LUBRICANTS**

NOTE: **This is a bulletin issued by Master Mechanic after Texaco Equipment Lubricants were installed on his road.**

THE TEXAS COMPANY
RAILWAY SALES DEPARTMENT
NEW YORK: Whitehall Building
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There is a Texaco Lubricant for Every Purpose

SERVICEABLE

The MURPHY SOLIDSTEEL ROOF resists distortion of the superstructure. This reduces the number of broken side posts and cracked gussets on steel frame or all steel box cars, and keeps them fit for service.

STANDARD RAILWAY EQUIPMENT CO.

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For Use With All A. R. A. JOURNAL BOXES

Special Features of the Universal Pedestal Truck Side Frame

It is arranged for use with any standard make of A. R. A. journal boxes.

It is interchangeable with any truck frame using A. R. A. boxes.

Its design gives maximum strength with minimum weight.

Its metal is carefully tested.

No rivets, bolts or tie bars are used in its construction.

It is easily and quickly assembled and few parts need be carried in stock for repairs.

Detail prints and information gladly furnished.

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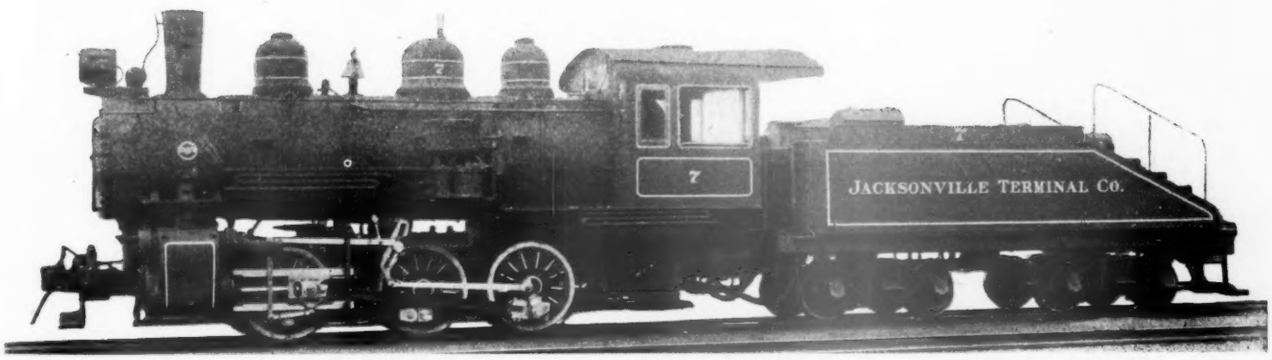
In its Rolling Mill Department the Scullin Steel Co. rolls standard sizes Merchant Bars—squares and rounds also flats 7½ in. and under; Structural Shapes—channels and beams 8 in. and under, angles up to 6 in., light rails up to 50 lb., and special sections on request.

"STANDARD" PARTS

on this Locomotive Consist of Steel and Malleable Iron Castings Driving Tires Forgings Springs



THE Jacksonville Terminal Company specified "Standard" Parts on this switch engine to insure continuous dependable service under the most exacting conditions of modern railroad yard operation.

No matter for what purpose your motive power is designed —whether it be for yard, road or industrial service, you should specify "Standard" Parts because of their durability, strength and wearing qualities.

"Standard" Parts on your locomotives are a positive guarantee of better service and greater economies.

"S" BRAND

"The 'Standard' Brand on your material is an assurance of eventual economy."

Standard Steel Works Co.

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Steel Tires, Steel Tired Wheels, Solid Forged and Rolled Steel Wheels, Rolled Steel Gear Blanks, Steel Axles, Steel Springs Steel and Iron Forgings, Steel and Malleable Iron Castings, Rolled Steel Rings, Steel Crusher-Rolls and Shells, Steel Pipe Flanges.

"Railway" Products

SPRINGS

—of all types, shapes and capacity for locomotive, passenger coach and freight car equipment.

TIRES

—Locomotive driving wheel, engine truck and tender wheel, also car wheel tires.

WHEELS

—all classes of steel tired wheels in general use under locomotive and car equipment.

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"Railway" extends a service which accepts definite responsibility. Whatever your requirements, presenting special problems, whether on old or new equipment, our engineers will furnish dependable counsel, plans and estimates.

RAILWAY STEEL-SPRING COMPANY

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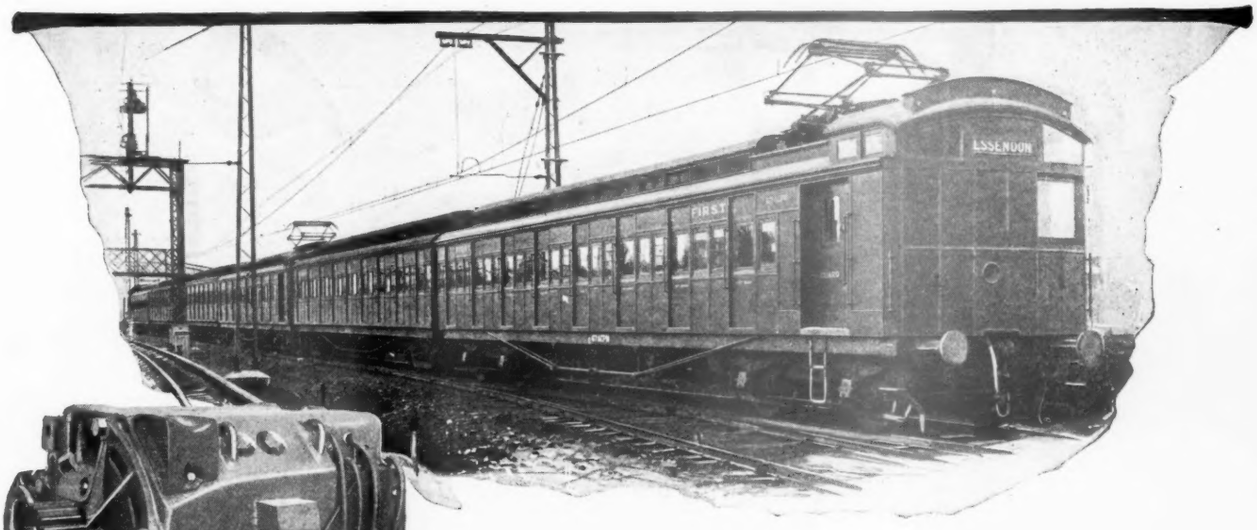
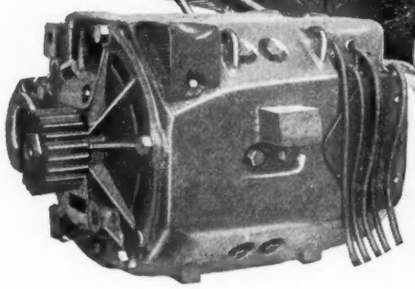
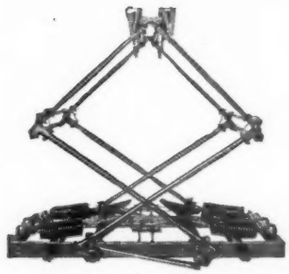
Louisville Mexico City
St Louis St Paul Norfolk
New Orleans

Health, housing and happiness—these three factors in the modern industrial life are dependent upon rapid transportation to counteract the evils of congestion.

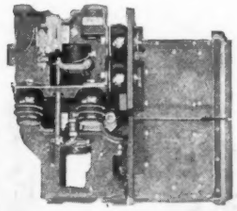




The World's Greatest Suburban Electrification



Pantograph Sliding Trolley.

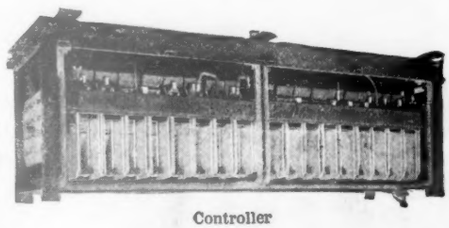


Line Breaker

As long ago as 1896 the General Electric Company suggested the electrification of the many-miled steam rapid-transit systems of "Melbourne the Magnificent." But it was March, 1913 before the contracts were placed by the State of Victoria, Australia.

With the experience of the world to draw from, Merz and McLellan, the engineers, recommended 1500 volts direct current and the use of G-E motor and control equipment for the 400 motor cars and 400 trailers to operate over 335 miles of single track. They found the high-tension direct current was the lowest in both first and continuing costs.

Electrification at Melbourne is making possible a great increase over the old steam schedule range of 13 to 18 miles per hour, thus helping to sustain the reputation of this metropolis as a city without congestion.

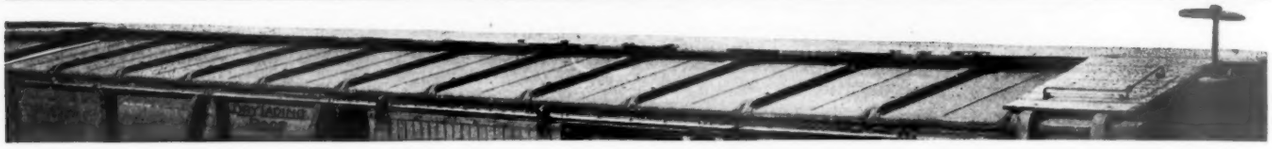


Controller

General Electric Company 25-94

General Office Schenectady, N.Y.

Sales Offices in all large cities



1922

FROM NOW TILL THEN

Michigan Central car No. 43155 is equipped with a

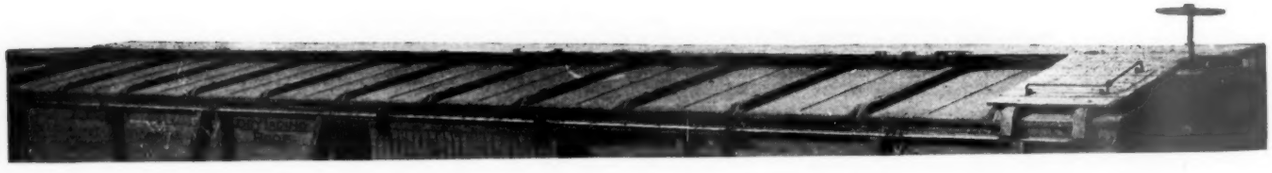
Hutchins All-Steel Flexible Roof

(The Dry Lading Roof)

which was applied in April, 1907. It has run over 14 years without roof maintenance expense.

The life of a roof new in 1907 and still running can be duplicated by roofs applied in 1922. Thousands of these roofs have run over 10 years without roof repairs.

HUTCHINS CAR ROOFING COMPANY
DETROIT MICHIGAN



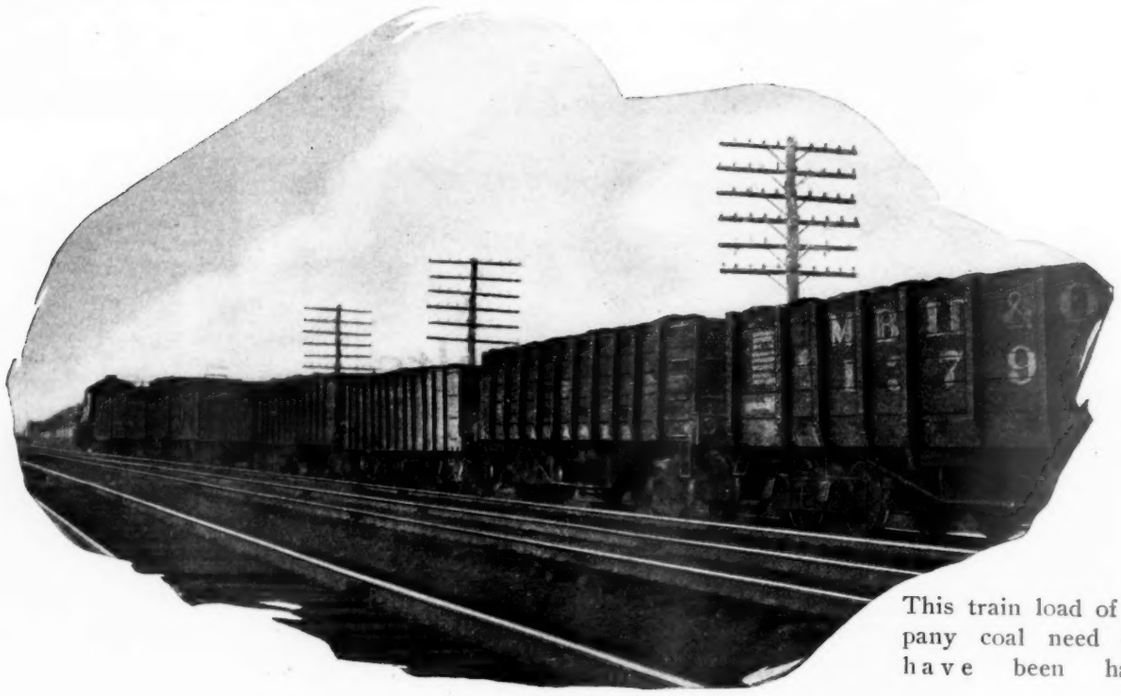
1936

Big Results From Small Investments

Of the total investment of railroads, only eight per cent is in locomotives. In proportion to their cost they are of maximum importance as, upon locomotives, depends the earning power of every rail, bridge, yard switch, station and every individual item necessary on a railroad.

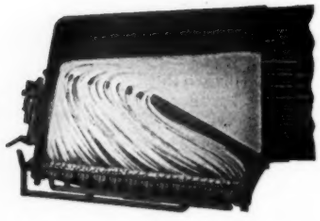
This, therefore, suggests the importance of every factor that increases the working capacity or the potential ton mileage of every locomotive. The capital expense of making it possible for every locomotive to exert its utmost effect upon ton mileage by giving it every capacity increasing improvement known is relatively small. While the investment in equipment is relatively small consider the fact that the cost of power, everything included, is not far from two billions a year. What are a few dollars per engine compared with the effect on the greater cost of the operation of the power.

G. M. BASFORD COMPANY



This train load of company coal need never have been hauled.

Arches release engines for revenue producing service



For your fuel record—have an arch in every engine you run.

Hauling company freight never paid dividends.

By saving 10% of the fuel burned by 70 locomotives, a carload of arch brick reduces their fuel consumption by 2100 tons in a month.

Result:—a locomotive released for revenue freight hauling, a train of coal saved, the cost of hauling a train of company material avoided.

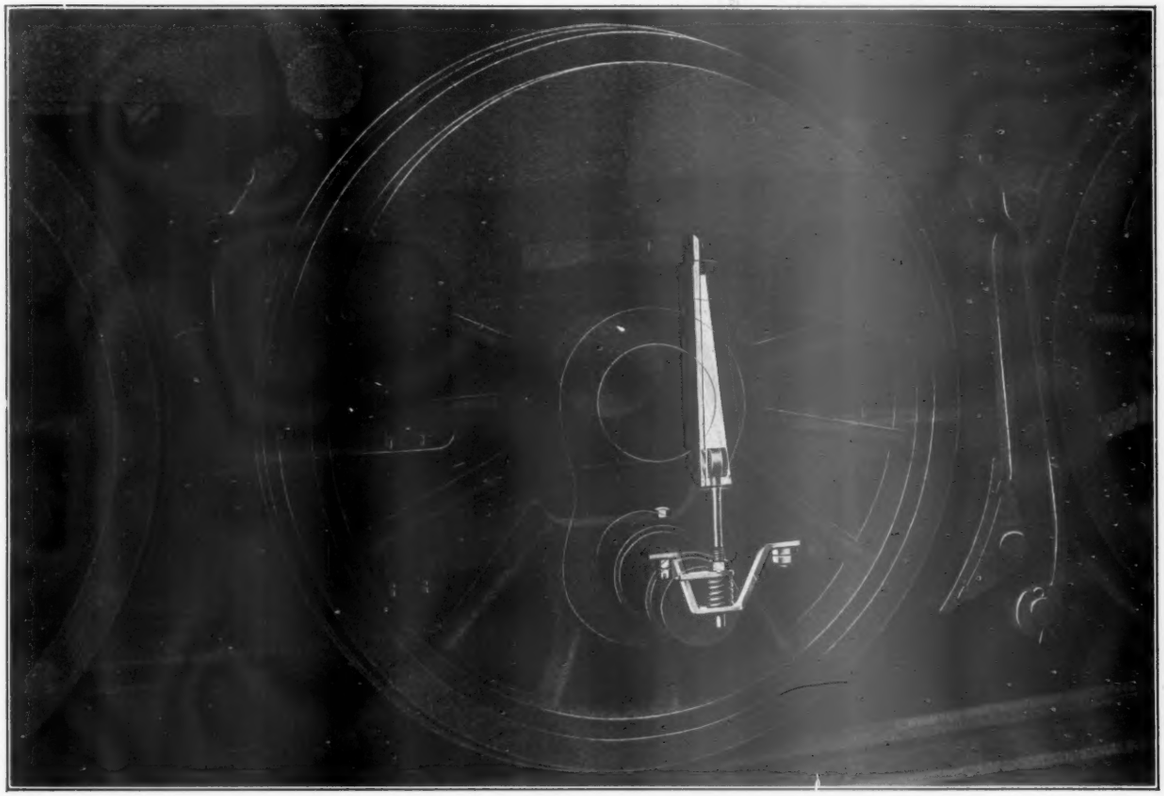
With the Arch on every engine there will be less company coal going over the road.

AMERICAN ARCH COMPANY, INC.
Locomotive Combustion Engineers

McCormick Building CHICAGO

17 East 42nd Street NEW YORK

Security Sectional Arch



Franklin Automatio Wedges adjust themselves with every revolution of the drivers

Stops slack before it starts

Every bearing wears as fast as the wedges.

When slack is noticeable enough to be reported by the engineer it's too late to save the bearings.

But by adjusting itself automatically as wear occurs the Franklin Automatic Wedge takes up the microscopic slack before damage is done by pounding boxes.

That is why Franklin Wedges soon pay for themselves many times over in brass saving alone.

Franklin Railway Supply Company, Inc.

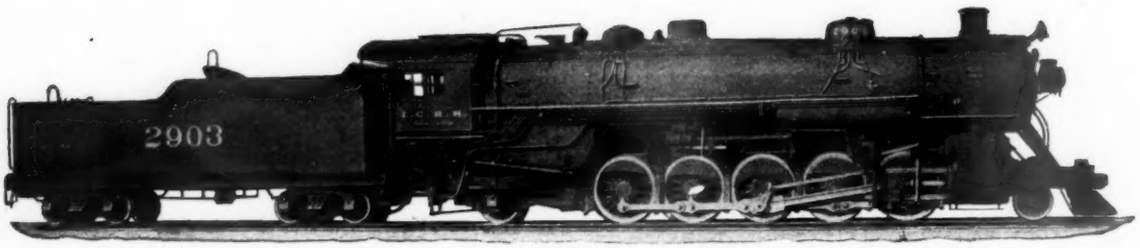
17 East 42nd Street, New York.

332 So. Michigan Avenue, Chicago, Ill. 1112 Praetorian Bldg., Dallas, Texas. 724 Monadnock Bldg., San Francisco, Cal.

Franklin Railway Supply Company of Canada, Limited, Montreal

Export Department—International Railway Supply Co.—30 Church St.

LIMA LOCOMOTIVES



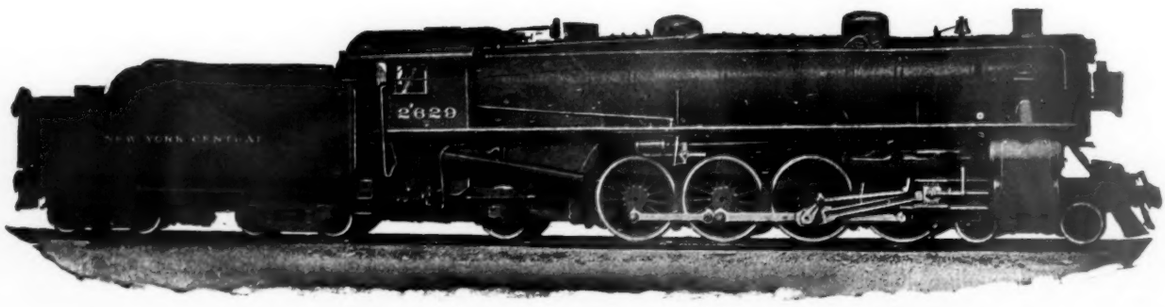
A LOOK AHEAD

In considering new locomotives it is well to have in mind the reduction in the cost of transportation that more powerful engines will effect. Increased power without increase in fuel consumption is what we mean. By careful design, including the best use of capacity increasing factors, the maximum of pulling capacity or the minimum fuel consumption may be obtained. The roads that go most thoroughly into the details of their new engines before they are ordered will get the most out of their new power. Lima is prepared to co-operate with you.

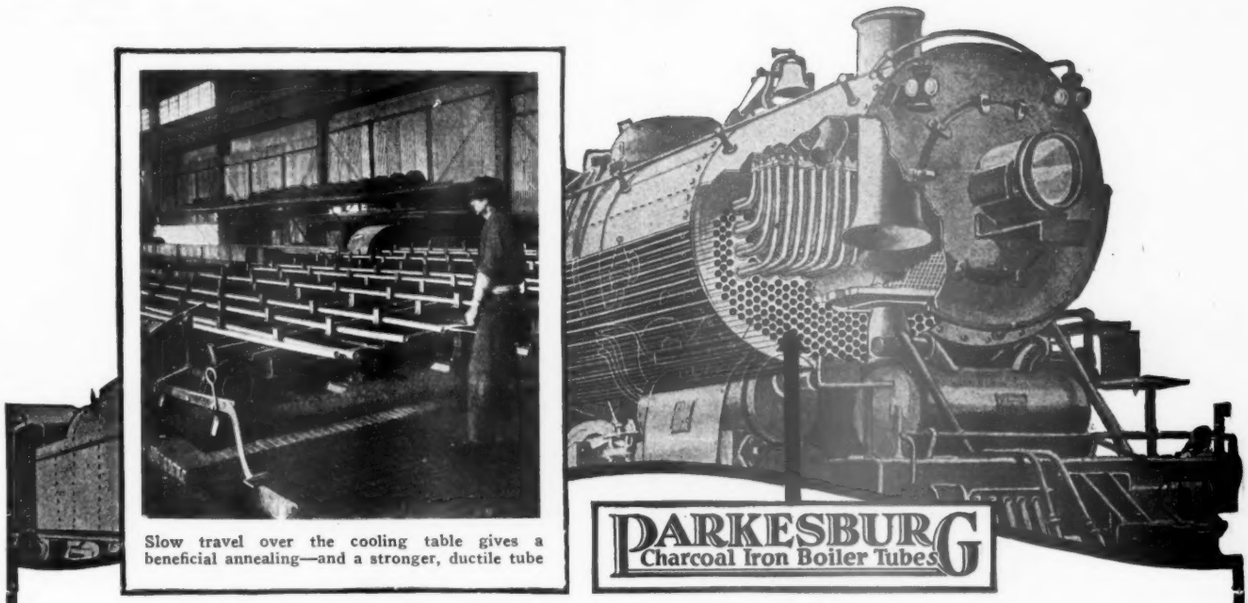
Building an engine exactly suited to conditions may mean five or ten more cars per train.

Lima Locomotive Works, Incorporated

Lima, Ohio 17 East 42nd Street, N. Y.



Slow travel over the cooling table gives a beneficial annealing—and a stronger, ductile tube



Which tube would You use?

A road on which Parkesburg Charcoal Iron Boiler Tubes are now standard formerly used tubes of another material.

Nine months was considered good service from a tube on this road, which has very poor water conditions.

In an effort to reduce flue costs, the road tried Parkesburg Charcoal Iron Boiler Tubes at a slightly higher price per foot.

They use Parkesburg tubes now. Some of them have been in service four years and are good for several more safe ends.

If you were responsible for locomotive maintenance on that road would you go back to the kind of tube that pitted in nine months? Or would you continue to use Parkesburg Charcoal Iron Boiler Tubes which have given four years' service under the same conditions, and are still good?

THE PARKESBURG IRON COMPANY

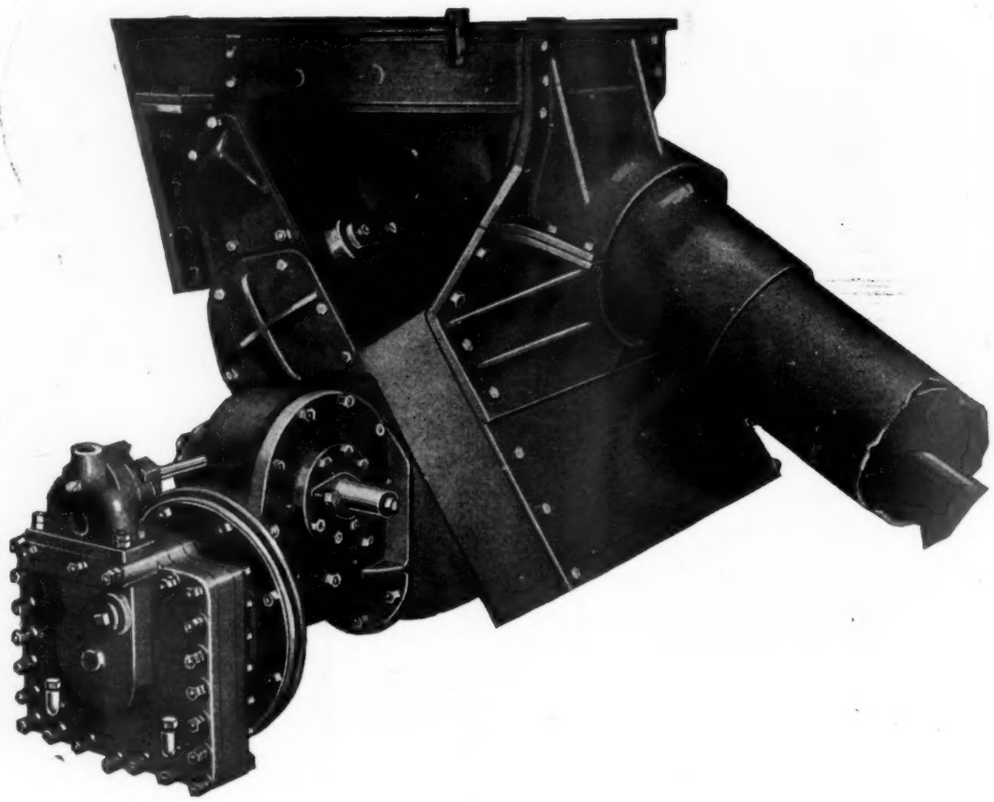
PARKESBURG, PA.

BRANCH OFFICES

New York, 30 Church Street — Boston, Oliver Building — Chicago, Fisher Building Philadelphia, Commercial Trust Building — St. Louis, Security Building — San Francisco, Rialto Bldg.—St. Paul, Merchants Nat'l. Bank Bldg.—Montreal, New Birks Bldg.

EXPORT AGENTS

Wonham, Bates & Goode Trading Corporation, New York



LESS WEIGHT

is carried on the trailer wheels of stoker fired locomotives equipped with ELVIN MECHANICAL STOKERS.

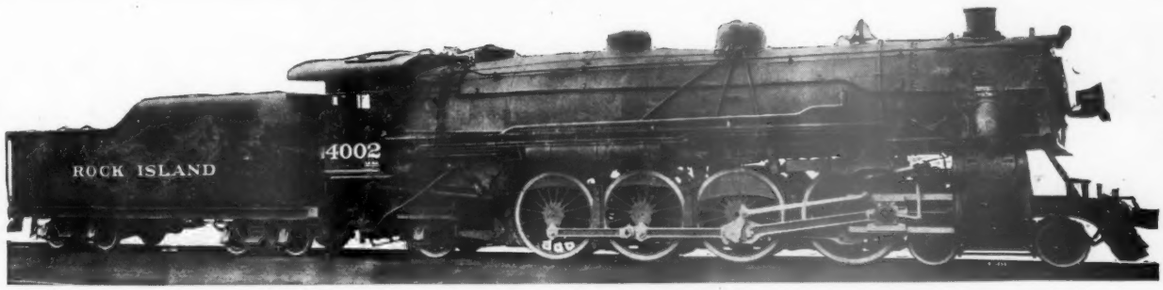
The illustration shows the complete stoker unit as applied to the locomotive and it weighs but 2900 lbs.

The feeder and coal breaker on the tender weigh 2400 lbs. No sacrifice of strength, capacity or durability has been made in attaining these weights.

Sounds interesting, doesn't it?

Why not investigate?

The Elvin Mechanical Stoker Company
50 Church Street New York City



Showing the Way

AMONG the many notable examples of Alco supremacy in recent years, none has surpassed the **Rock Island's Mountain type** locomotives in successful operation and sustained performance.

Some idea of their efficiency may be gained from the following data on the **Golden State Limited,** and other famous Rock Island trains:

These Mountain type locomotives have averaged 5,000 miles per month each. There has not been one delay on account of hot bearings or rod bushings, and steam failures are unknown even under the most trying conditions.

On the Missouri Division, they are assigned to the *Golden State Limited,* making an average schedule of 45 miles per hour, including stops, with 12 to 16 solid steel cars, weight of train ranging from 830 to 1,200 tons.

On the Iowa Division between Valley Junction and Rock Island, a distance of 181 miles, they handle the *Rocky Mountain Limited,* usually a 13 car train scheduled at 39 miles per hour. On different occasions they have made up an average of 45 minutes on this running time.

In one instance engine 4004 between Valley Junction and Omaha, handled twelve 16-compartment stateroom Pullmans and a buffet in less than three hours' running time, an average of 46.6 miles per hour. This trip includes several one per cent grades.

There is a vast difference between the mere purchase of locomotives, and really buying locomotive service.

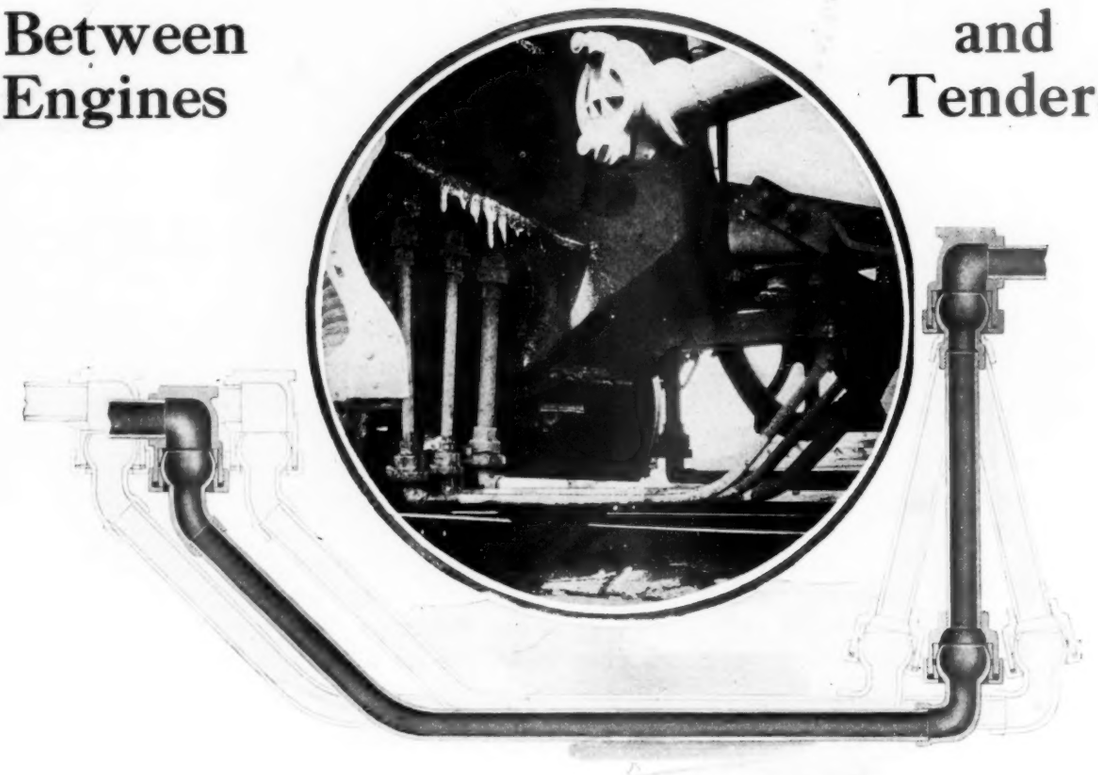
When you specify Alco—you get both

American Locomotive Company

30 Church Street **New York, N. Y.**

BARCO 3V CONNECTIONS

Between Engines and Tenders



Safeguard Your Train Service

BARCO All Metal 3V Connections provide that absolutely dependable construction so essential at the most vital point in your train lines—the connections between engine and tender.

It is here that Barco Engine Tender Connections safeguard your train service by eliminating a common cause of delays and failures—defective or burst hose.

Practically indestructible because of their all metal construction, and perfectly flexible under all conditions, Barco 3V Connections are a positive guarantee of a continuous and unobstructed flow of steam and air.

When you equip your locomotives with Barco 3V Connections, you not only safeguard your train service but you are also taking decisive action towards cutting your repair costs by eliminating the continual expense of renewing hose.

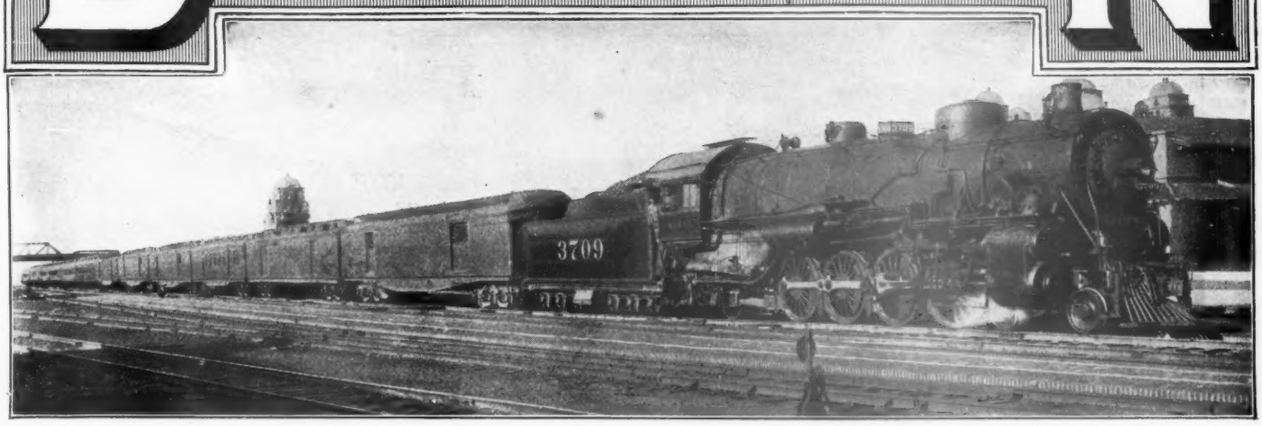
To insure safe, dependable, train service and to effect large reductions in your maintenance expense, specify Barco 3V Engine Tender Connections.

Barco Manufacturing Company

CHICAGO, ILL.

IN CANADA MONTREAL - TORONTO **THE HOLDEN CO., LTD.,** IN CANADA WINNIPEG - VANCOUVER

BALDWIN



BALDWIN MOUNTAIN (4-8-2) TYPE LOCOMOTIVE ON THE SANTA FE

Baldwin Mountain Type Locomotives Meet Requirements on Heaviest Grades

HEAVY passenger traffic on the mountain divisions of the Santa Fe System is handled by Baldwin Locomotives of the 4-8-2 type. These locomotives were designed and built in accordance with specifications furnished by the Railway Company and are designated as the 3700 class. They are equipped to burn either coal or oil, according to the district to which they are assigned.

The illustration shows east-bound passenger train No. 10, hauled by Engine No. 3709, a coal burner, ready to leave Albuquerque for Raton, New Mexico, a run of 243 miles. The maximum grade on this section is 158.4 feet per mile. The locomotive is stoker fired, weighs 367,700 pounds and develops a tractive force of 54,100 pounds.

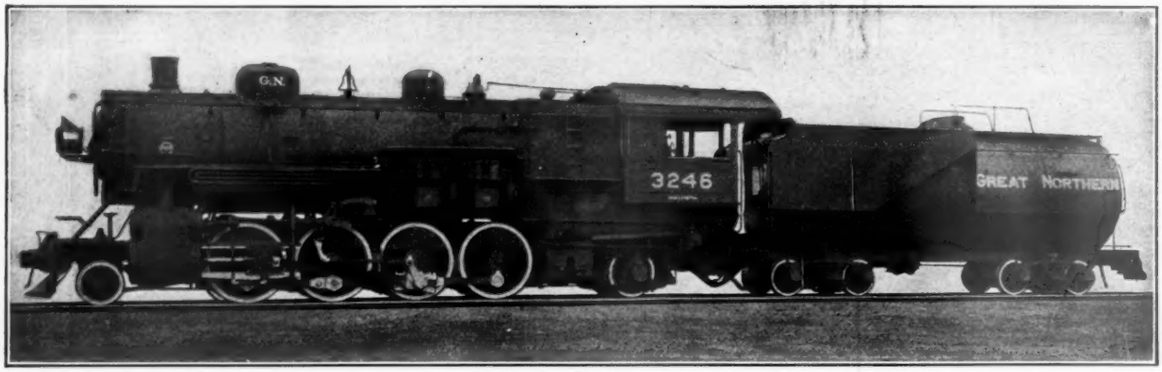
Under the supervision of John Purcell, Assistant to the Vice President, the Motive Power Department of the Santa Fe, co-operating with The Baldwin Locomotive Works, has developed a series of high power passenger and freight locomotives which are successfully meeting the most difficult operating conditions.

Baldwin Locomotives are Standard on the Santa Fe

THE BALDWIN LOCOMOTIVE WORKS
PHILADELPHIA

LOCOMOTIVES

One of the Forty-five Mikado type locomotives recently built for the Great Northern Railroad, all of which were fitted with Duplex Stokers



Duplex Stoker's New Year Resolutions

(1) Duplex Stoker will bring out full capacity of locomotive.
(2) Will haul more tonnage per freight train.
(3) Will make quicker trip with regular number of cars per train.
(4) Will make up lost time.
(5) Will make hard schedules on time.
(6) Will take an extra car or two on heavy passenger trains without trouble.
(7) Will enable passenger trains to make extra divisions without fire-cleaning.
(8) Will carry thin, extra hot fire and keep engine hot.
(9) Will distribute coal uniformly and economically over entire fire-bed.
(10) Will maintain the good reputation of—

Over 4,500 of Our Stokers in Service on 76 Railroads

LOCOMOTIVE STOKER COMPANY

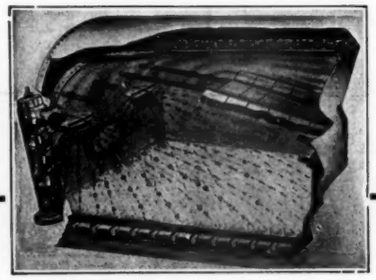
50 CHURCH STREET
NEW YORK

Main Office and Works
Pittsburgh, Pa.

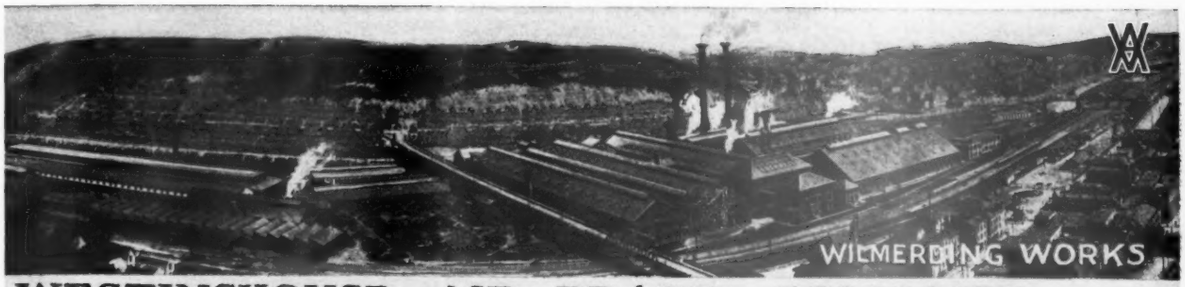
RAILWAY EXCHANGE
CHICAGO, ILL.

MUNSEY BUILDING, WASHINGTON, D. C.

Duplex Stokers distribute the—



—Coal uniformly and economically



WESTINGHOUSE AIR BRAKE COMPANY

1922

To our friends, the Railroads, and our esteemed contemporaries in the Railway Supply field.

New Year's Greeting

THE Westinghouse Air Brake Company takes this opportunity to extend a courteous New Year's Greeting to its customers and friends in the Railway and the Railway Supply industries.

Present conditions indicate that 1922 will find our common interests advanced as we increase our efforts to serve each other. The splendid co-operation which has existed in the past between the Railroads, the Westinghouse Air Brake Company, and the other Railway Supply Manufacturers, has been a source of mutual satisfaction to all concerned, and stands now as a staunch foundation on which to build for future progress and prosperity.

Service and Co-operation have always been associated with Westinghouse traditions; they remain the keywords of our business creed for 1922.

A. L. Humphrey

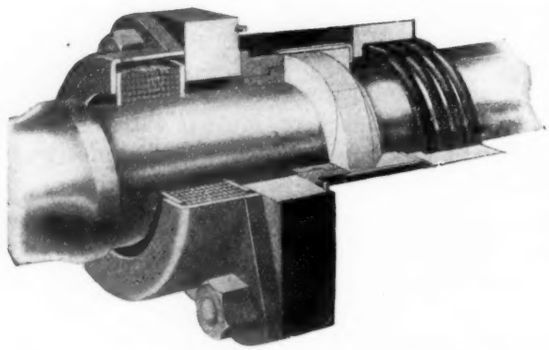
PRESIDENT

WESTINGHOUSE AIR BRAKE CO.

GENERAL OFFICES AND WORKS, WILMERDING, PA.

NEW YORK WASHINGTON CHICAGO ST. LOUIS SAN FRANCISCO

When You Figure Temperature Tonnage Ratings

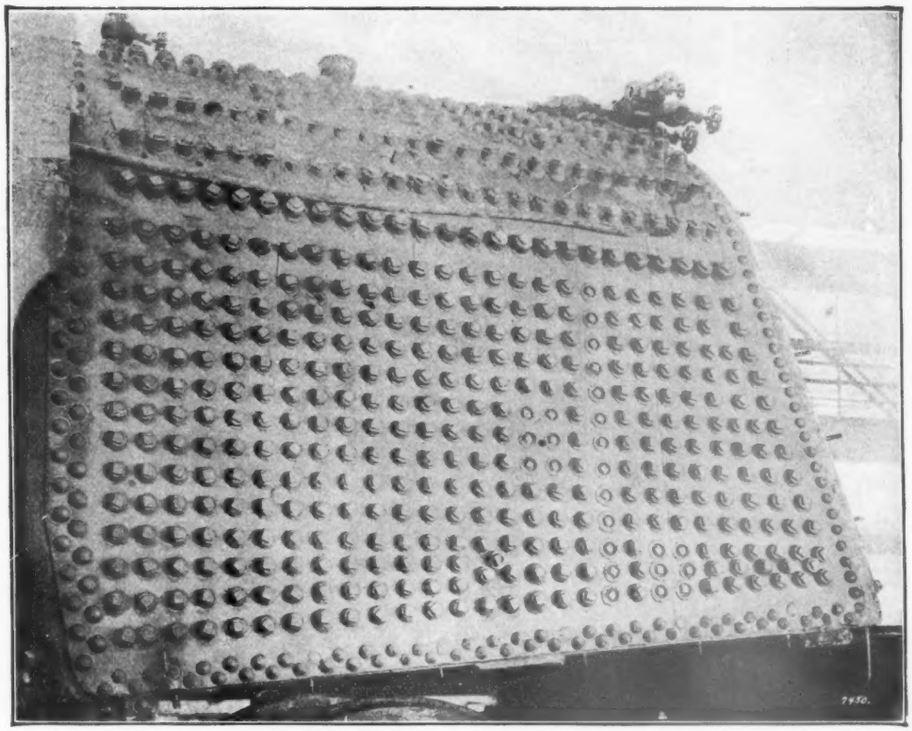


In cold weather when you are forced to reduce locomotive tonnage because friction is greater and it is more difficult to keep up steam, it is well to be able to depend on a good, reliable packing to prevent leaks at the piston rod and valve stem. If these vital parts are not steam-tight, the locomotive would be placed at a greater disadvantage and unable to handle even the lower tonnage efficiency.

The application of King Metallic Packing is a precautionary measure in the interest of better locomotive performance, lower fuel consumption, and safety.

The United States Metallic Packing Co.
PHILADELPHIA PENNSYLVANIA

F.B.C. Welded Flexible Staybolts



This illustration of a complete installation of the

"F. B. C." WELDED FLEXIBLE STAYBOLT

recently completed in a set of ten locomotive boilers for one of the large railroad systems and the reports received to date indicate that the locomotives are giving exceptional service without the necessity of expending any money for minor repairs, and not a leaky staybolt.

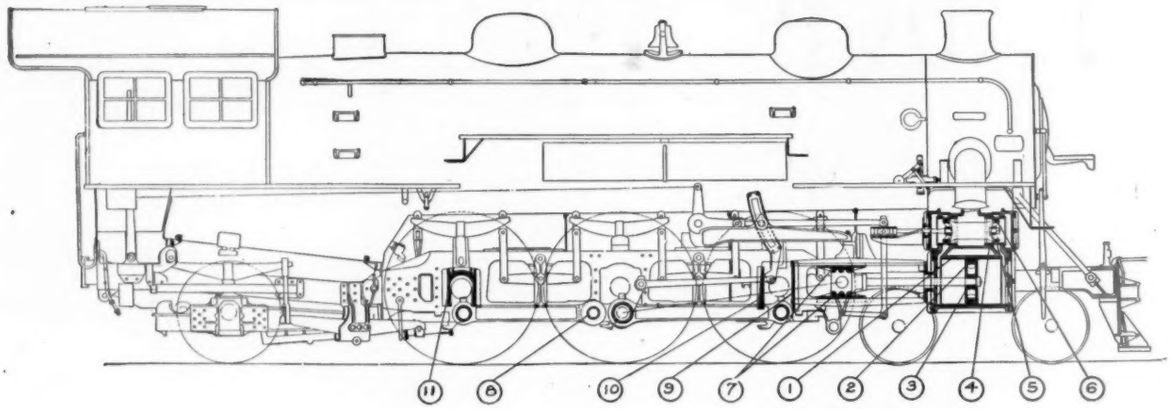
The cost of application was reduced more than 40%.

Are You Ready to Make Trial Installation?

SPECIFY "F. B. C." FLEXIBLE STAYBOLTS IN NEW EQUIPMENT AND USE IT IN REPAIRS

FLANNERY BOLT COMPANY

Vanadium Building **Pittsburgh, Pa.**



3 PISTONS

SHOULD BE

HUNT-SPILLER GUN IRON

Piston heads stand the brunt of locomotive power. The tractive effort is directly in proportion to the pressure applied to them. They must be strong and tough to stand the high temperature and pressure.

Hunt-Spiller Gun Iron will meet these requirements plus the wear resisting qualities which insure long service with freedom from breakage and minimum amount of wear.

Made Only by

HUNT-SPILLER MFG. CORPORATION

W. B. Leach Pres. & Gen. Mgr. J. G. Platt, Vice-Pres. & Sales Mgr.

Office and Works

383 Dorchester Ave. South Boston, 27, Mass.

116,000 MILES-
and not a Penny for Repairs

NO failures, no delays, no repairs, not even a bushing in 14 months—such is the report on the valve gear mechanism of the locomotive pulling a famous Eastern passenger express covering 400 miles daily and 116,000 miles between shoppings. Not one penny was spent to maintain

THE BAKER VALVE GEAR

This performance however is not unusual but typical of Baker Service which controls the "Spending" of the coal money in the cylinders.

Beside this great reduction in maintenance charges, the Baker Valve Gear provides for the quick and sharp opening of valve which gives full boiler pressure from admission to cut off. The great advantage of this feature is the fact that quick snappy port openings prevent wire drawing of the steam and loss of effective pressure on the cylinders.

Apply the Baker Valve Gear now—the Savings will follow.

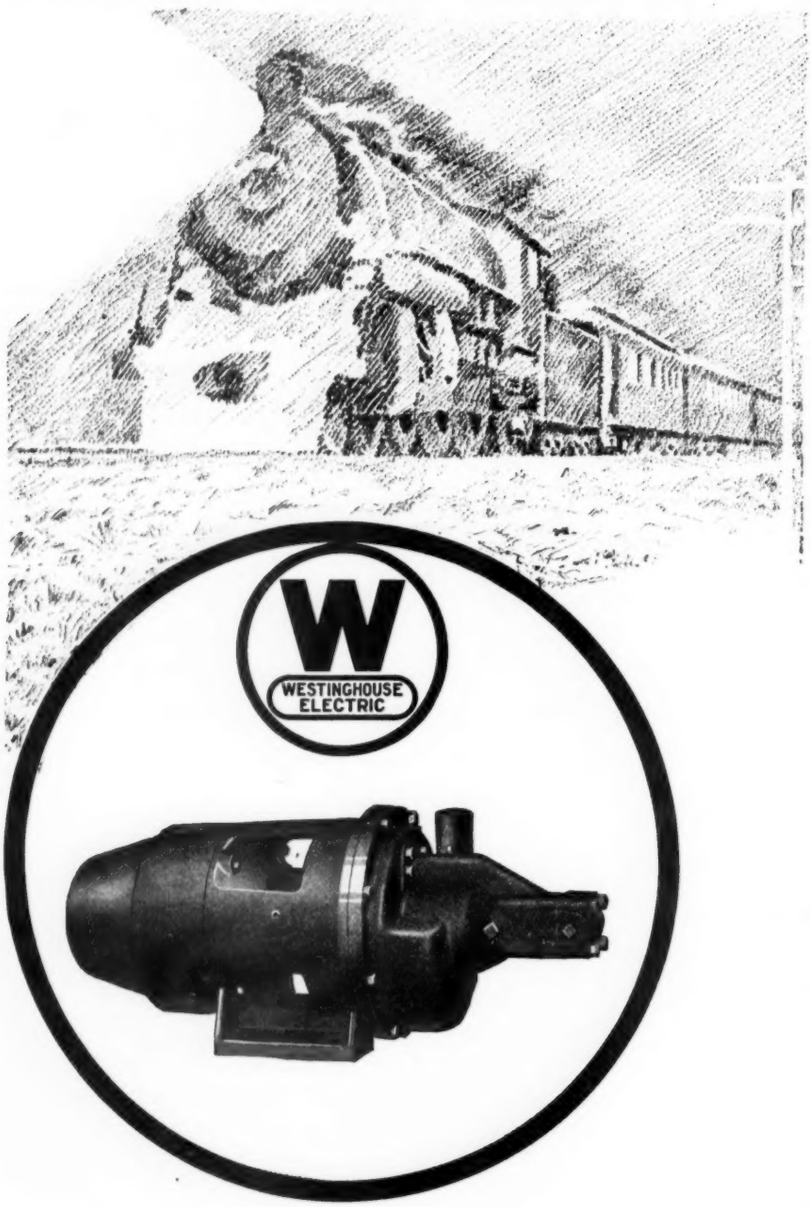
THE PILLIOD COMPANY

30 Church St., New York

Railway Exchange Bldg., Chicago

Works: Swanton, Ohio

Low Maintenance Means Reduced Expense



Westinghouse
Turbine-Generator
Locomotive Headlighters

being totally enclosed, are not affected by weather conditions, or by dirt and dust to which they are subjected on top of a locomotive.

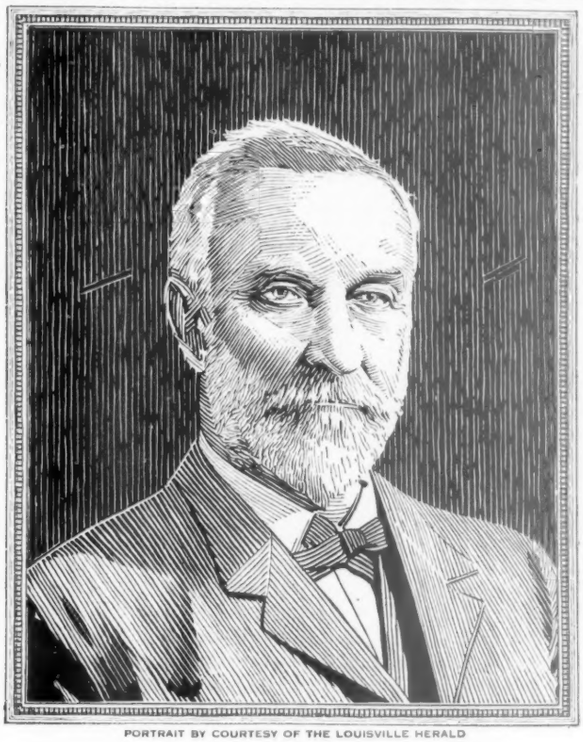
Their weight and size allow easy handling to and from a locomotive, while their construction will withstand the shocks and strains met with in service.

Operating records on many steam roads show the Westinghouse Headlighter to be most reliable and economical. A solid rotor with milled slots serving as blades, ball bearings, and many other advantages make the unit most desirable. For detailed information write to our nearest office or to the Railway Department.

Westinghouse Electric & Manufacturing Company
East Pittsburgh, Pa.

Westinghouse

GREAT BUILDERS



PORTRAIT BY COURTESY OF THE LOUISVILLE HERALD

Milton H. Smith

The romance of the life of Milton Hannibal Smith was the doctrine of singleness of purpose—work. His dream of a united South—an industrial empire—doubtless inspired by the chaotic conditions resulting from the Civil War, became a reality, before his death, through the developmental stimulus of the Louisville and Nashville Railroad.

During his association with this road its 185 miles of single track between Louisville and Nashville grew into a system of over 5000 miles dominating the southeastern quarter of the United States. His breadth of vision enabled his road to aid in releasing and developing the coal and iron of Tennessee, Kentucky and Alabama, to which fact may be attributed the virtual creation of the Birmingham district.

The love of accuracy in the smallest details, for which Milton H. Smith was noted, is representative of the painstaking care which has been used for over three-quarters of a century in the manufacture of Tennessee Charcoal Bloom Staybolt Iron.

EWALD IRON COMPANY
INCORPORATED
LOUISVILLE

CHICAGO NEW YORK ST. PAUL

"In Use Since 1844"

SAFETY

is of maximum importance when buying railroad wheels.

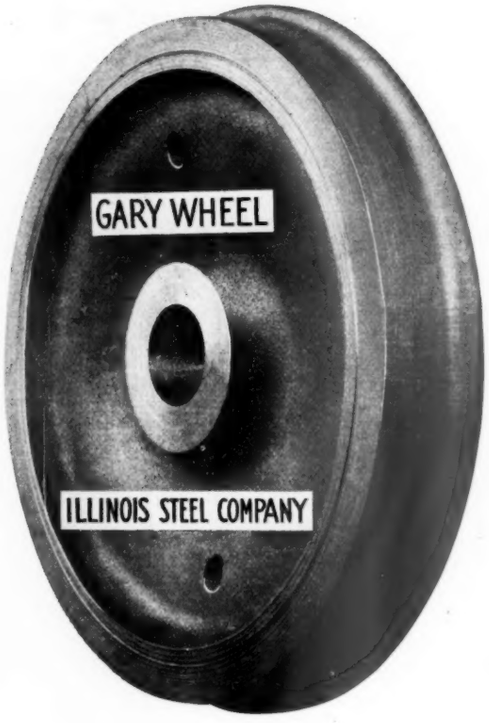
Specify

Gary STEEL Wheels

Manufactured by

Illinois Steel Company

General Offices, 208 S. La Salle Street
CHICAGO, ILLINOIS



An Efficient Pipe Covering must not contain Combustible Material

The combustible or inflammable element in some pipe coverings runs as high as 20 to 22 per cent. Under low temperatures such coverings may possibly remain a long time unimpaired but high temperatures will soon char the inner zone or layers. Bulk having been reduced, the covering will sag, air currents will run along the under side of the pipe and a continual loss of heat will take place.

85% Magnesia possesses, in addition to other essential qualities, the virtue of heat-resistance without impairment. There is nothing combustible in 85% Magnesia. Even tests with temperatures from 700 to 900 deg. F., continued for months, show only a calcination, which actually increased the efficiency of the covering about three per cent.

85% Magnesia taken from pipes after twenty years' use may be placed on other heated surfaces, and will keep on doing its good work.

Magnesia Association of America

765 Bulletin Building, Philadelphia, Pa.

Executive Committee, William A. Macan, Chairman

George D. Crabbs ..... The Philip Carey Company ..... Cincinnati, Ohio.
Alvin M. Ebret ..... Ebret Magnesia Mfg. Co..... Valley Forge, Pa.
J. R. Swift ..... The Franklin Mfg. Co..... Franklin, Pa.
R. V. Mattison, Jr..... Keasbey & Mattison Co..... Ambler, Pa.

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"The Standard for Rubber Insulation"

OKONITE
TRADE MARK.

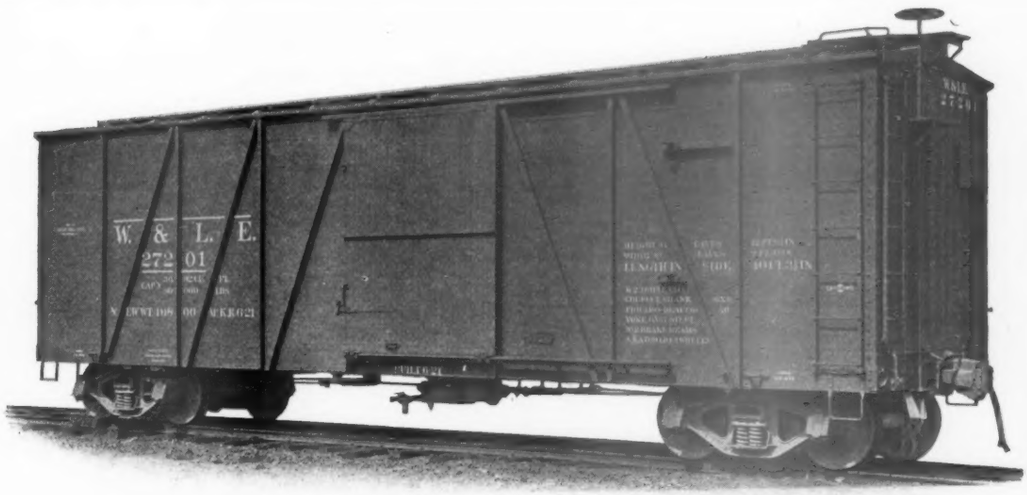
VARNISHED CAMBRIC WIRES and CABLES

are made with the same care and high regard for quality which distinguishes the production of Okonite rubber insulation.

We are prepared to handle any high grade proposition, and solicit your inquiries.

"Manson" Tape (Friction)—"Okonite" Tape (Splicing Compound).

THE OKONITE COMPANY, PASSAIC, N. J.
Incorporated 1884
Central Electric Co., Chicago, Ill., Gen. Western Agents
F. D. Lawrence Electric Co., Cincinnati, O. Novelty Electric Co., Philadelphia, Pa.
Pettingell-Andrews Co., Boston, Mass.



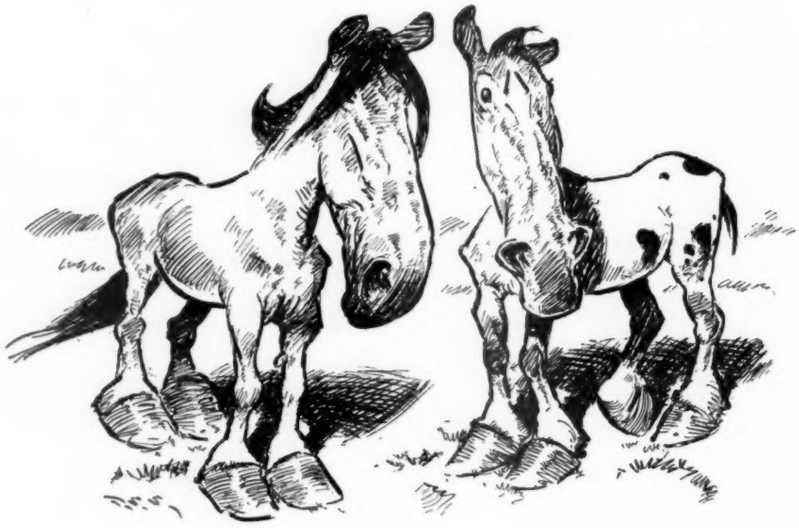
RAILWAY CARS OF ALL TYPES

Complete Facilities for Repairing and Rebuilding Cars

REPAIR PARTS—BOLSTERS—TRUCKS—CASTINGS—FORGINGS—GREY IRON WHEELS

PRESSED STEEL CAR CO.

NEW YORK PITTSBURGH CHICAGO ST. PAUL WASHINGTON, D. C.



PRIME'S PLUGS

THE PRIME MANUFACTURING COMPANY
MILWAUKEE, WISCONSIN

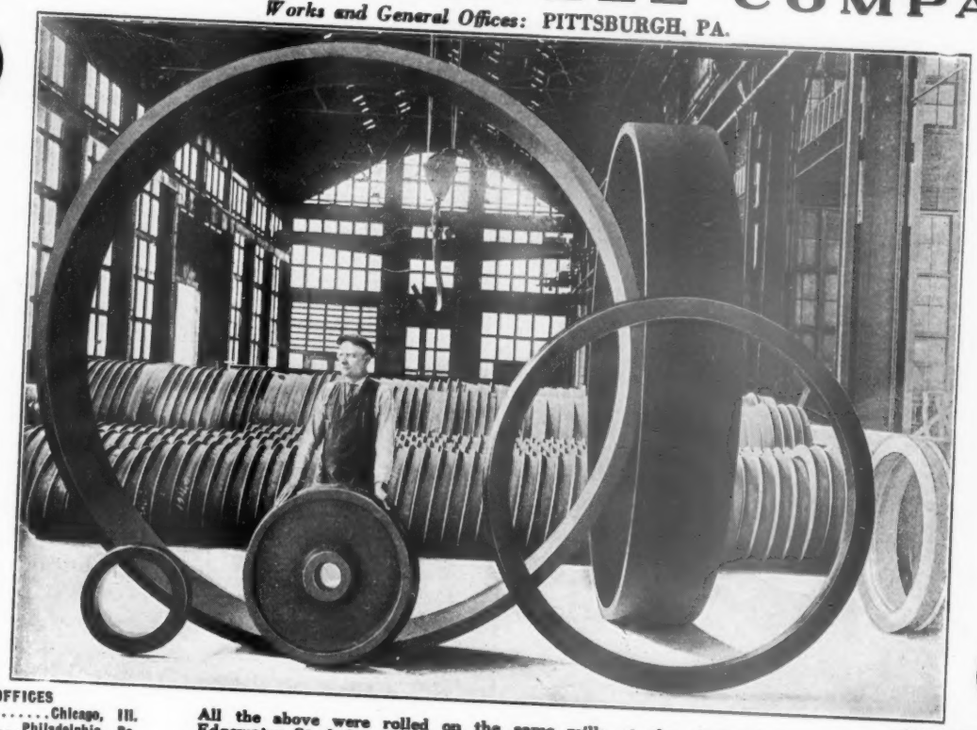
The Ralston Steel Car Company

COLUMBUS, OHIO

Design, Build and Repair
All Classes of Freight Cars
And Steel Underframes

EDGEWATER STEEL COMPANY

Works and General Offices: PITTSBURGH, PA.



All the above were rolled on the same mills at the plant of Edgewater Steel Co., Pittsburgh. The small ring is 14½" inside diameter. The large rings are 133¼" inside diameter, 21¼" wide and weigh 7600 lbs. each. The 72" locomotive driving tire and the 36" passenger car wheel show the versatility of the mills.

SALES OFFICES
McCormick Bldg.....Chicago, Ill.
Finance Bldg.....Philadelphia, Pa.
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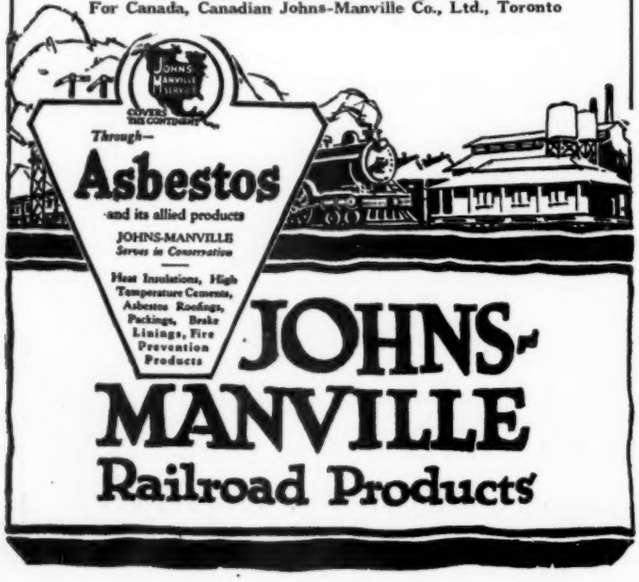

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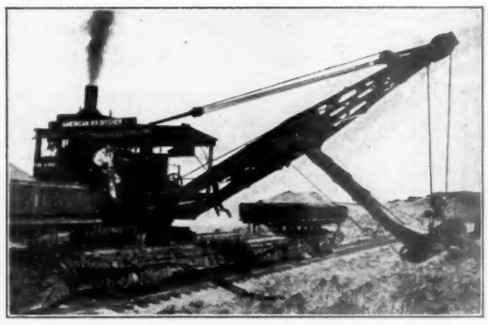

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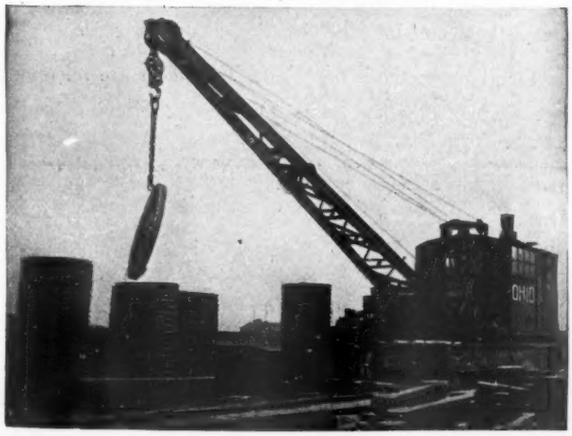

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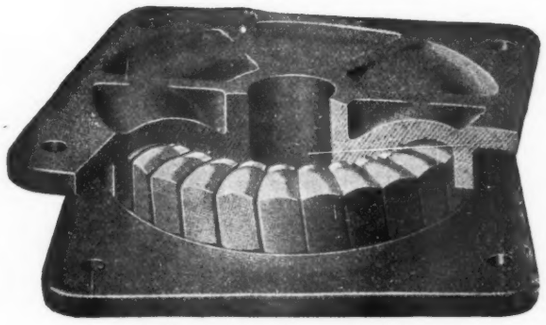

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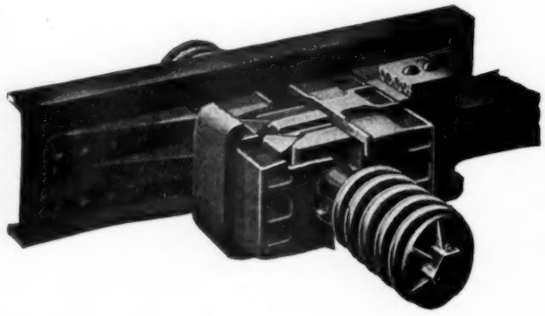

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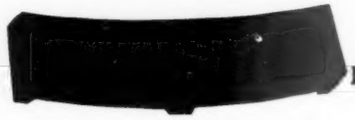
Safety  Economy

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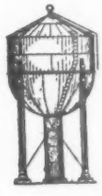

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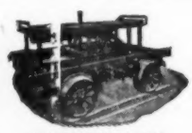
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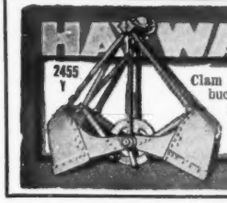

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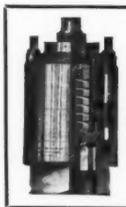
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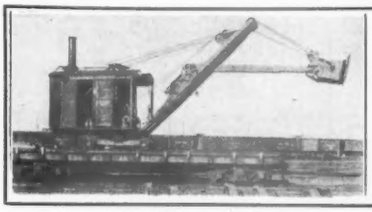
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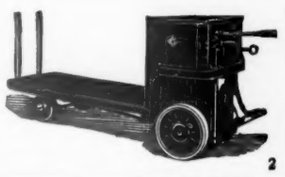
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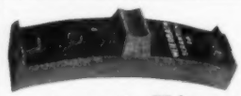
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2—75-ton Ten Wheelers; 19x26"; 180 lb. pressure
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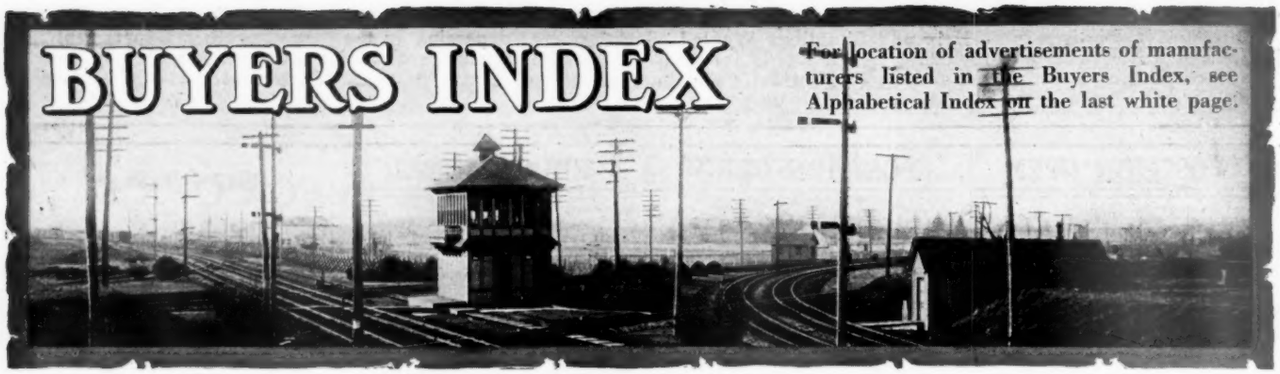
BUYERS INDEX



For location of advertisements of manufacturers listed in the Buyers Index, see Alphabetical Index on the last white page.

Acetylene, Dissolved.
Air Reduction Sales Co.

Air Lifts.
Ingersoll Rand Co.

Air Reservoir Joints—(See Joints, Air Reservoir).

Angle Bars — (See Joints, Rail).

Angles, Channels and Tees—(See Shapes, Structural).

Arch, Locomotive Brick.
American Arch Co.

Arresters, Lightning.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Axles, Car and Locomotive.
American Locomotive Co.
Baldwin Locomotive Works, The
Cambria Steel Co.
Illinois Steel Co.
Lima Locomotive Works
Pollak Steel Co.
Standard Steel Works

Barges, Steel.
Pittsburgh-Des Moines Steel Co.

Barrels, Tumbling.
Whiting Corp.

Bars, Concrete Reinforcing.
American Steel & Wire Co.
Cambria Steel Co.
Illinois Steel Co.
Interstate Iron & Steel Co.
Midvale Steel Co.
Pollak Steel Co.

Bars, Iron and Steel.
Cambria Steel Co.
Ewald Iron Co.
Falls Hollow Staybolt Co.
Illinois Steel Co.
Pollak Steel Co.
Ryerson & Son, Joseph T.

Batteries, Electric Storage.
Electric Storage Battery Co.
Safety Car Heating & Lighting Co.

Batteries, Wet Cell.
Electric Storage Battery Co.

Bearings, Center.
Chicago Ry. Equipment Co.
Miner, W. H.
Pressed Steel Car Co.
Symington Co., T. H.
Woods & Co., Edwin S.

Bearings, Journal.
Magnus Co., Inc.

Bearings, Side.
American Steel Foundries
Chicago Ry. Equipment Co.
Fort Pitt Malleable Iron Co.
Miner, W. H.
Standard Car Truck Co.
Wine Ry. Appliance Co.
Woods & Co., Edwin S.

Benders, Rail.
American Chain Co.

Bending and Straightening Machines.
Ryerson & Son, Joseph T.

Billets, Steel.
Cambria Steel Co.
Illinois Steel Co.
Midvale Steel & Ordnance Co.

Blanks, Rolled Gear.
Cambria Steel Co.
Midvale Steel & Ordnance Co.

Blocks, Creosoted.
Jennison Wright Co.

Blower Fittings, Automatic Smokebox.
Barco Mfg. Co.

Blow Off Line Joints, Roundhouse—(See Joints, Etc.).

Boilers, Locomotive.
American Locomotive Co.
Baldwin Locomotive Works
Lima Locomotive Works

Boilers, Water Tube.
Babcock & Wilcox

Bolsters, Steel.
American Steel Foundries
Illinois Steel Co.
Pressed Steel Car Co.
Scullin Steel Co.

Bolts and Nuts.
Boss Nut Co.
Cambria Steel Co.
Columbia Nut & Bolt Co.
National Malleable Castings Co.
Ryerson & Son, Joseph T.

Bolts, Patch.
Falls Hollow Staybolt Co.

Bolts, Track.
Illinois Steel Co.

Books.
Simmons Boardman Pub. Co.

Booster.
Franklin Ry. Supply Co.

Booths, Telephone.
Dickinson, Inc., Paul.

Boring and Turning Mills, Vertical.
Niles-Bement-Pond Co.

Boring and Turning Mills, Horizontal.
Sellers & Co., Inc., Wm.

Braces, Rail.
American Chain Co.
Cambria Steel Co.
Fort Pitt Malleable Iron Co.
Midvale Steel & Ordnance Co.
National Malleable Castings Co.
Ramapo Iron Works

Brake Beams.
American Steel Foundries
Chicago Ry. Equipment Co.
Pressed Steel Car Co.

Brake Beams—Supports.
American Steel Foundries
Chicago Ry. Equipment Co.

Brake Forging, Pins, Levers, Etc.
American Steel Foundries
Pollak Steel Co.
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Brake Shoes.
American Brake Shoe & Fdy. Co.
Fort Pitt Malleable Iron Co.
Railway Materials Co.
Weierbach Brake Shoe Co.

Brakes, Air.
General Electric Co.
Westinghouse Air Brake Co.

Brakes, Clasp.
American Steel Foundries

Brakes, Electric
Westinghouse Air Brake Co.

Brakes, Hand.
Miner, W. H.
Minich Ry. Appliance Co.
National Malleable Castings Co.
Wine Ry. Appliance Co.

Brick Locomotive Arch.
American Arch Co.

Bridge Builders.
Arnold Co.
Fowler, Chas. Evan.
Pittsburgh-Des Moines Steel Co.

Buckets, Clam Shell.
Blaw-Knox Co.
Brown Hoisting Machy. Co.
Browning Co.
Industrial Works
Orton & Steinbrenner Co.

Buckets, Grab.
American Hoist & Derrick Co.
Blaw-Knox Co.
Brown Hoisting Machy. Co.
Browning Co.
Hayward Co.
Industrial Works
Orton & Steinbrenner Co.

Buffers, Friction.
Miner, W. H.
Westinghouse Air Brake Co.

Buffers, Radial.
Franklin Ry. Supply Co.

Buildings, Iron Steel and Steel Concrete.
Arnold Co.
Ferguson Co., H. K.
Pittsburgh-Des Moines Steel Co.
Robertson Co., H. H.
Robinson Co., Dwight P.
Stone & Webster
White Eng. Corp., J. G.

Buildings, Portable Steel.
Blaw-Knox Co.

Bulldozers.
Niles-Bement-Pond Co.
Ryerson & Son, Joseph T.

Burners, Bunsen, Oxygen, Gas.
Air Reduction Sales Co.

Cables, Electric.
American Steel & Wire Co.
General Electric Co.
Kerite Insulated Wire & Cable Co.
Okonite Co.

Cableways—(See Tramways).

Calcium Carbide.
Air Reduction Sales Co.

Car Ends, Steel.
Chicago Cleveland Car Roof Co.

Car Lighting Equipment — (See Lighting Car Equipment).

Carlines.
Chicago Cleveland Car Roofing Co.
General Electric Co.
Pressed Steel Car Co.
Standard Ry. Equipment Co.
Western Ry. Equipment Co.

Car Material, Wood.
Exchange Sawmills Sales Co.
Mummert Lumber & Tie Co.

Car Steps, Safety.
American Abrasive Metals Co.

Carriers, Monorail.
Conveyors Corp. of America

Cars, Ballast.
Cambria Steel Co.
General American Car Co.
Pressed Steel Car Co.

Cars, Convertible.
Cambria Steel Co.
Keith Ry. Equipment Co.

Cars, Dump.
Cambria Steel Co.
Clark Car Co.
General American Car Co.
Pressed Steel Car Co.

Cars, Freight.
American Car & Fdy. Co.
Cambria Steel Co.
General American Car Co.
Greenville Steel Car Co.
Pressed Steel Car Co.
Ralston Steel Car Co.
Youngstown Steel Car Co.

Cars, Hand and Push.
Fairbanks, Morse & Co.
Mudge & Co.

Cars, Industrial.
Pressed Steel Car Co.
Whiting Corp.

Cars, Motor (Section).
Clark Car Co.
Fairbanks, Morse & Co.
Mudge & Co.

Cars, Ore.
Clark Car Co.
Pressed Steel Car Co.

Cars, Passenger.
American Car & Fdy. Co.
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American Car & Fdy. Co.
General American Car Co.
General American Tank Car Corp.
Greenville Steel Car Co.
Pressed Steel Car Co.
Ralston Steel Car Co.
Youngstown Steel Car Co.

Cars, Refrigerator.
General American Car Co.
Pressed Steel Car Co.

Cars, Second-Hand.
Southern Iron & Equip. Co.
Zelincker Supply Co., Walter A.

Cars, Self-Propelled Passenger.
General Electric Co.

Cars, Shapes, Pressed Steel.
Sharon Pressed Steel Co.

Cars, Spreader.
Jordan Co., O. F.

Cars, Tank.
American Car & Fdy. Co.
General American Tank Car Corp.
Pressed Steel Car Co.

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Magnus Co., Inc.

Castings, Gray Iron.
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Ramapo Iron Works

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Fort Pitt Malleable Iron Co.
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Pressed Steel Car Co.

Castings, Steel.
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American Steel Foundries
Edgewater Steel Co.
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Midvale Steel & Ordnance Co.
Pressed Steel Car Co.
Standard Steel Works
Union Spring & Mfg. Co.

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Johns-Manville, Inc.

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American Chain Co.

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Dearborn Chemical Co.

Chemists.
Dearborn Chemical Co.
Hunt & Co., Robert W.
Pittsburgh Testing Laboratories

Chimneys, Cast Iron.
Dickinson, Inc., Paul

Chucks, Drill.
Chicago Pneumatic Tool Co.

Chucks, Staybolt Driving.
Chicago Pneumatic Tool Co.

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Conveyors Corp. of America
Roberts & Schaefer Co.

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General Electric Co.
Westinghouse Elec. & Mfg. Co.

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Ryerson & Son, Joseph T.

Clamps, Hose.
National Malleable Castings Co.
Westinghouse Air Brake Co.

Clamps, Pipe.
Franklin Ry. Supply Co.
National Malleable Castings Co.

Cleaners, Flue.
Ryerson & Son, Joseph T.

Closets, Water.
Duner Co.

Coach and Coach Yard Steam Joints—(See Joints, Etc.).

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Brown Hoisting Machinery Co.
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Coaling Stations.
Fairbanks, Morse & Co.
Pittsburgh-Des Moines Steel Co.
Roberts & Schaefer Co.

Cocks, Angle.
Westinghouse Air Brake Co.

Cocks, Cylinder.
Prime Mfg. Co.
U. S. Metallic Packing Co.

Columns, Cast Iron Building.
U. S. Cast Iron Pipe & Fdry. Co.

Columns, Water.
Pittsburgh-Des Moines Steel Co.

Compounds, Boiler.
Dearborn Chemical Co.

Compressors, Air.
General Electric Co.
Ingersoll Rand Co.

Conduits, Metallic Flexible.
Barco Mfg. Co.
Franklin Railway Supply Co.

Connections, Truck Lever.
National Malleable Castings Co.
Schaefer Equipment Co.

Connectors, Automatic T. P. —(See Train Pipe Connectors, Automatic).

Connectors, Electrical.
Westinghouse Elec. & Mfg. Co.

Control Devices, Train Speed.
Miller Train Control Corp.

Controllers, Electrical.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Converters, Steel.
Whiting Corp.

Conveying Machinery.
Conveyors Corp. of America
Industrial Works
Orton & Steinbrenner Co.

Conveyor, Ash—(See Coal Ore and Ash Handling Mach.)

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Mohawk Lubricating Co.

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Couplers.
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McConway & Torley Co.
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Standard Coupler Co.
Westinghouse Air Brake Co.

Couplings, Hose.
Chicago Pneumatic Tool Co.
Fort Pitt Malleable Iron Co.
Ingersoll Rand Co.
Westinghouse Air Brake Co.

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Brown Hoisting Mchy. Co.
Ferguson Co., H. K.
Niles-Bement-Pond Co.
Whiting Corp.

Cranes, Gantry.
Brown Hoisting Mchy. Co.
Industrial Works
Niles-Bement-Pond Co.
Orton & Steinbrenner Co.
Whiting Corp.

Cranes, Jib.
Brown Hoisting Mchy. Co.
Industrial Works
Niles-Bement-Pond Co.
Whiting Corp.

Cranes, Locomotive.
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Brown Hoisting Mchy. Co.
Industrial Works
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Brown Hoisting Mchy. Co.
Browning Co.
Industrial Works
Orton & Steinbrenner Co.

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Creosote.
Barrett Co., The
Jennison Wright Co.

Cross Arms.
American Bridge Co.

Crossheads and Shoes.
Baldwin Locomotive Works, The
Barco Mfg. Co.

Crossings—(See Frogs and Crossings).

Crushers, Coal.
Orton & Steinbrenner Co.

Culverts.
American Sheet & Tin Plate Co.
Armco Culvert & Flume Mfrs. Assn.
U. S. Cast Iron Pipe & Fdy. Co.

Cupolas, Foundry.
Whiting Corp.

Cups, Oil and Grease.
Prime Mfg. Co.

Curtains and Fixtures, Car Window.
Morton Mfg. Co.

Curtains & Fixtures, Car Vestibule
Morton Mfg. Co.

Cutters, Flue.
Ryerson & Son, Joseph T.

Cutting and Welding Apparatus (Oxy-Acetylene).
Air Reduction Sales Co.
Westinghouse Elec. & Mfg. Co.

Cutters and Keys (Spring).
Columbia Nut & Bolt Co.

Cyclopedias, Railway.
Simmons Boardman Pub. Co.

Cylinders, Gas, Acetylene, Etc.
Air Reduction Sales Co.

Derricks.
Industrial Works

Diaphragms, Buffing, Mechanism.
Morton Mfg. Co.

Diaphragms for Cars, Canvas and Steel.
Morton Mfg. Co.

Dies, Threading.
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American Hoist & Derrick Co.
Browning Co.
Industrial Works
Jordon Co., O. F.
Osgood Co., The

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Door, Locomotive, Fire-Box.
Franklin Railway Supply Co.

Doors, Car.
Camel Co.
Miner, W. H.
Wine Ry. Appliance Co.

Doors, Grain.
Mummert Lumber & Tie Co.

Doors, Steel.
Morton Mfg. Co.

Draft Arms.
American Steel Foundries
Bradford Draft Gear Co.

Draft Gears.
Fort Pitt Malleable Iron Co.
Keyoke Ry. Equip. Co.
Miner, W. H.
Standard Coupler Co.
Symington Co., T. H.
Union Draft Gear Co.
Westinghouse Air Brake Co.

Draft Yokes.
American Steel Foundries
Keyoke Ry. Equip. Co.
Miner, W. H.
National Malleable Castings Co.
Steel Car Forge Co.

Drawbar Centering Device.
Miner, W. H.

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Industrial Works
Osgood Co., The
Pittsburgh-Des Moines Steel Co.

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Chicago Pneumatic Tool Co.

Drilling Machines, Pneumatic.
Chicago Pneumatic Tool Co.
Ingersoll Rand Co.

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Chicago Pneumatic Tool Co.
General Electric Co.
Ingersoll Rand Co.

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Niles-Bement-Pond Co.
Ryerson & Son, Joseph T.

Drills, Track and Bonding.
Chicago Pneumatic Tool Co.
Ingersoll Rand Co.

Drills, Twist.
Greenfield Tap & Die Corp.

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Driving Boxes (Extended Main).
Franklin Railway Supply Co.

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Whiting Corp.

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General Electric Co.
Westinghouse Elec. & Mfg. Co.

Electrification, Railroad.
General Electric Co.
Robinson Co., Dwight P.
Smith & Co., C. E.
Westinghouse Elec. & Mfg. Co.

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Roberts and Schaefer Co.
Robinson Co., Dwight P.
Stone & Webster
Watson Engineering Co.
White Eng. Corp., J. G.

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Roberts and Schaefer Co.
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Stone & Webster
Watson Engineering Co.
White Eng. Corp., J. G.

Engineers, Consulting, Civil, Elec., Hydraulic., Mech. Val.
Arnold Co.
Bush, Roberts & Schaefer
Ferguson Co., H. K.
Fowler, Chas. Evans.
Gilmore, Thomas N.
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Brown Hoisting Mchy. Co.
Industrial Works
Orton & Steinbrenner Co.

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Arnold Co.
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Fort Pitt Malleable Iron Co.
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Continental Fibre Co.

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Filtration Plants (Water).
Graver Corp.

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American Locomotive Co.
Baldwin Locomotive Works

Fire Fighting and Protection Equipment.
Johns-Manville, Inc.

Fittings, Air Brake.
National Malleable Castings Co.
Westinghouse Air Brake Co.

Fittings, Flanged Pipe.
U. S. Cast Iron Pipe & Fdry. Co.

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Camel Co.
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National Malleable Castings Co.

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Exchange Sawmills Sales Co.
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Forges, Rivet Heating.
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Illinois Steel Co.
Midvale Steel & Ordnance Co.
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Morton Mfg. Co.

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Standard Steel Works

Gears and Pinions.
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Westinghouse Elec. & Mfg. Co.

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Fairbanks, Morse & Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

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Mississippi Wire Glass Co.

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Galena Signal Oil Co.

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Franklin Railway Supply Co.

Grease Forming Machines.
Franklin Railway Supply Co.

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Vapor Car Heating Co., Inc.
Wine Ry. Appliance Co.

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Hoists, Electric.
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Hose, Clamp Tool.
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Johns-Manville, Inc.
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Franklin Ry. Supply Co.

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Barco Mfg. Co.
Franklin Ry. Supply Co.

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Barco Mfg. Co.
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Hunt & Co., Robert W.
Pittsburgh Testing Laboratory

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Wine Railway Appliance Co.

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Lathes, Engine.
Niles-Bement-Pond Co.
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Pollak Steel Co.

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Baldwin Locomotive Works
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American Locomotive Co.
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Galena Signal Oil Co.
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Bush, Roberts & Schaefer

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Browning Co.
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Pollak Steel Co.

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Midvale Steel & Ordnance Co.
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American Locomotive Co.

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Prime Mfg. Co.

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American Chain Co.

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Railway Steel Spring Co.
Standard Steel Works.

Torches, Welding and Cutting.
Air Reduction Sales Co.

Tractors, Industrial.
Elwell Parker Electric Co.

Tractors, Turntable.
Nichols & Bros., Geo. P.
Whiting Corp.

Trailers, Industrial.
Sharon Pressed Steel Co.

Train Control Systems.
Miller Train Control Corp.

Tramways (Wire Rope).
American Steel & Wire Co.

Transfer Tables.
Brown Hoisting Mchy. Co.
Industrial Works.
Whiting Corp.

Transformers.
Westinghouse Elec. & Mfg. Co.

Transmission Towers.
Blaw-Knox Co.
Brown Hoisting Mchy. Co.

Traps, Steam.
Crane Co.

Treads, Safety.
American Abrasive Metals Co.
American Mason Safety Tread Co.
Morton Mfg. Co.

Treatment, Water—(See Water Softening and Purifying).

Truck Frames—(See Frames Truck).

Trucks, Car and Locomotive.
American Locomotive Co.
American Steel Foundries.
Baldwin Locomotive Works.
Franklin Railway Supply Co.
Pressed Steel Car Co.
Standard Car Truck Co.

Trucks, Electric Storage Battery.
Elwell Parker Electric Co.

Trucks, Industrial.
Elwell Parker Electric Co.
Sharon Pressed Steel Co.
Whiting Corp.

Tubes, Boiler.
Allegheny Steel Co.
Cambria Steel Co.
Midvale Steel & Ordnance Co.
Parkesburg Iron Co.
Ryerson & Son, Joseph T.

Tubes, Stay.
Falls Hollow Staybolt Co.

Turbo Generators.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Turbines, Steam.
Westinghouse Elec. & Mfg. Co.

Turnbuckles.
Columbia Nut & Bolt Co.

Turntables.
Industrial Works.
Whiting Corp.

Underframes, Steel.
Greenville Steel Car Co.
Pressed Steel Car Co.
Ralston Steel Car Co.
Youngstown Steel Car Co.

Unloaders, Ballast.
Osgood Co., The

Upholstery, Car.
Chase & Co., L. C.

Valves, Blower and Blow Off.
Crane Co.
Crosby Steam Gage & Valve Co.

Valve Gear, Locomotive.
Pilliod Co.

Valves, Cab.
Crane Co.

Valves, Drifting.
Franklin Railway Supply Co.

Valves, Globe.
Crane Co.

Valves, Piston.
Franklin Railway Supply Co.

Valves, Pop, Safety and Relief.
Ashton Valve Co.
Crane Co.
Crosby Steam Gage & Valve Co.
Westinghouse Air Brake Co.

Valves, Pressure Regulating.
Crane Co.

Ventilators, Car.
Mudge & Co.
Vapor Car Heating Co., Inc.
Wine Railway Appliance Co.

Ventilators, Shop and Roundhouse.
Dickinson, Inc., Paul.
Johns-Manville, Inc.
Robertson Co., H. H.

Washers.
National Malleable Castings Co.
Wine Railway Appliance Co.

Washing Systems, Boiler.
National Boiler Washing Co. of Ill.

Water Columns — (See Columns, Water).

Water Cooling Equipment.
Giessel Co., Henry.

Waterproofing Materials.
Lehon Co., The.

Water Purifying Materials and Compounds.
Dearborn Chemical Co.

Water Softening and Purifying.
Dearborn Chemical Co.
Graver Corp.

Wedges, Automatic.
Franklin Ry. Supply Co.

Wedges, Journal Box.
American Steel Foundries.
National Malleable Castings Co.
Steel Car Forge Co.

Welding Machines, Electric.
Westinghouse Elec. & Mfg. Co.

Welding Machines, Flue.
Ryerson & Son, Joseph T.

Welding and Cutting Apparatus — (See Cutting and Welding Apparatus).

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Air Reduction Sales Co.

Wheel Centers, Driving.
American Locomotive Co.
American Steel Foundries.
Baldwin Locomotive Works.
Edgewater Steel Co.
Hunt Spiller Mfg. Corp.
Standard Steel Works.

Wheels, Car and Locomotive.
American Locomotive Co.
American Steel Foundries.
Baldwin Locomotive Works.
Edgewater Steel Co.
Illinois Steel Co.
Lima Locomotive Works.
Midvale Steel & Ordnance Co.
Pressed Steel Car Co.
Railway Steel Spring Co.
Standard Steel Works.

Wheels, Cast Iron.
Pressed Steel Car Co.

Wheels, Mine Car.
Edgewater Steel Co.

Wheels, Pressed Steel Motor Car.
Fairbanks, Morse & Co.
Mudge & Co.

Wheels, Steel and Steel Tired.
Cambria Steel Co.
Edgewater Steel Co.
Illinois Steel Co.

Whistles, Locomotive.
Ashton Valve Co.
Crosby Steam Gage & Valve Co.
General Electric Co.
Westinghouse Air Brake Co.

Winches.
Chicago Pneumatic Tool Co.

Windows, Locomotive Cabs' Clear Vision.
Prime Mfg. Co.

Windows, Weatherproofing.
Morton Mfg. Co.

Wire.
American Steel & Wire Co.
Kerite Insulated Wire & Cable.
Okonite Co.

Wire, Barb.
American Steel & Wire Co.

Wire, Fence.
American Steel & Wire Co.
Interstate Iron & Steel Co.

Wire, Insulated.
American Steel & Wire Co.
General Electric Co.
Kerite Insulated Wire & Cable.
Okonite Co.

Wire, Rail Bond—(See Rail Bonds).

Wire, Rope.
American Steel & Wire Co.

Wire, Telephone & Telegraph.
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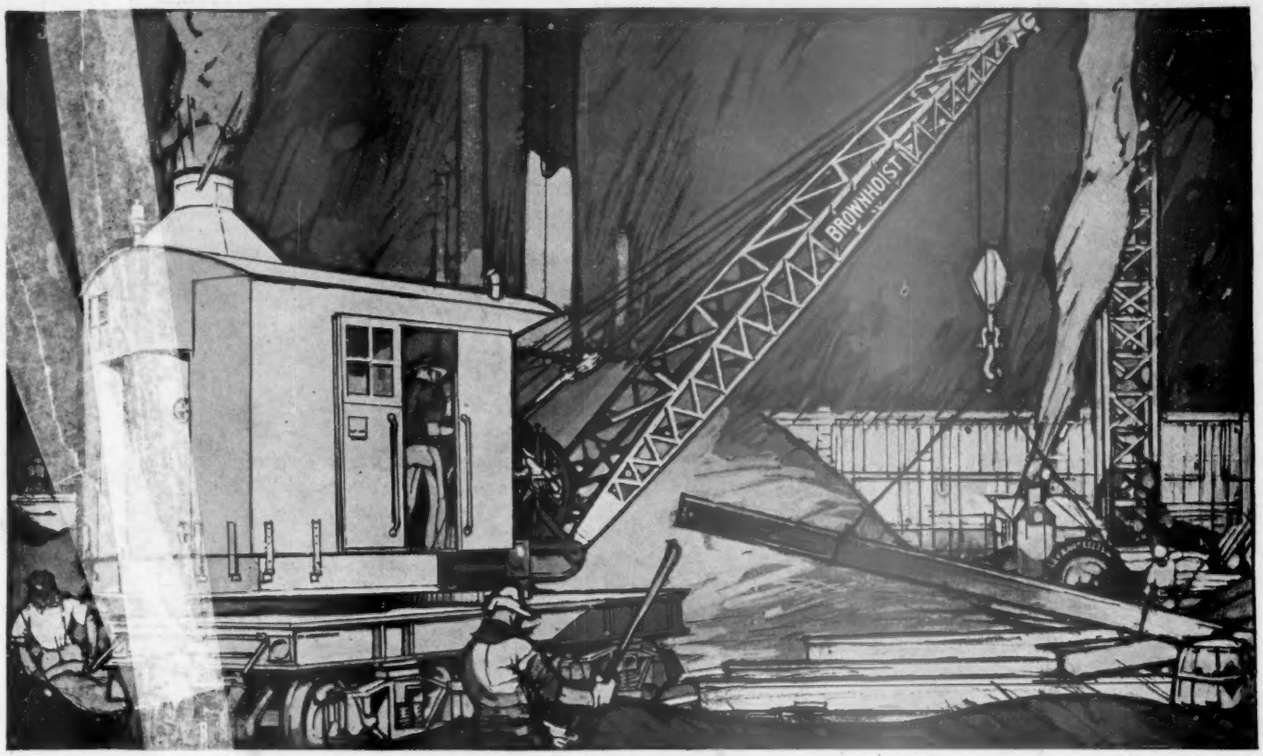

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